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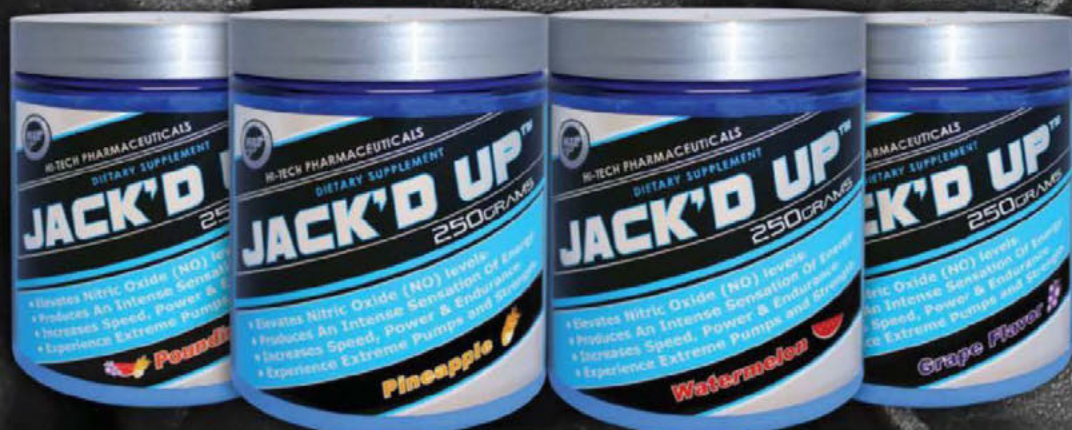
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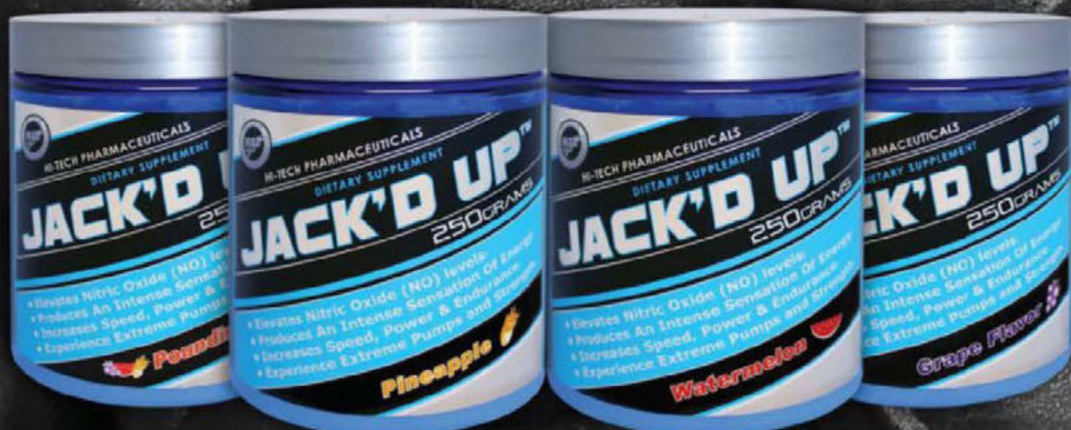
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A black and white photograph of a muscular man with a beard and intense gaze. He has extensive tattoos on his right shoulder and arm. The lighting is dramatic, highlighting his physique.

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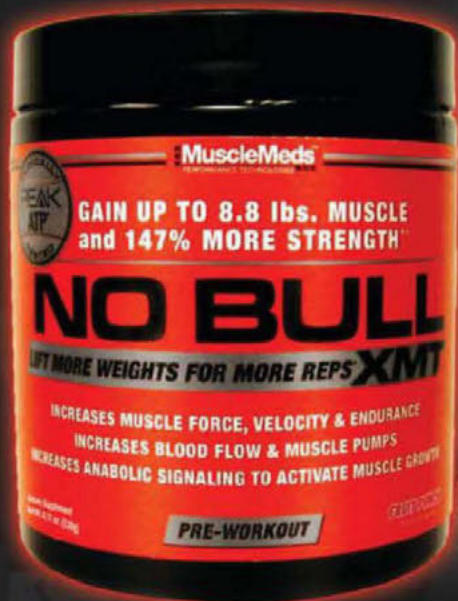
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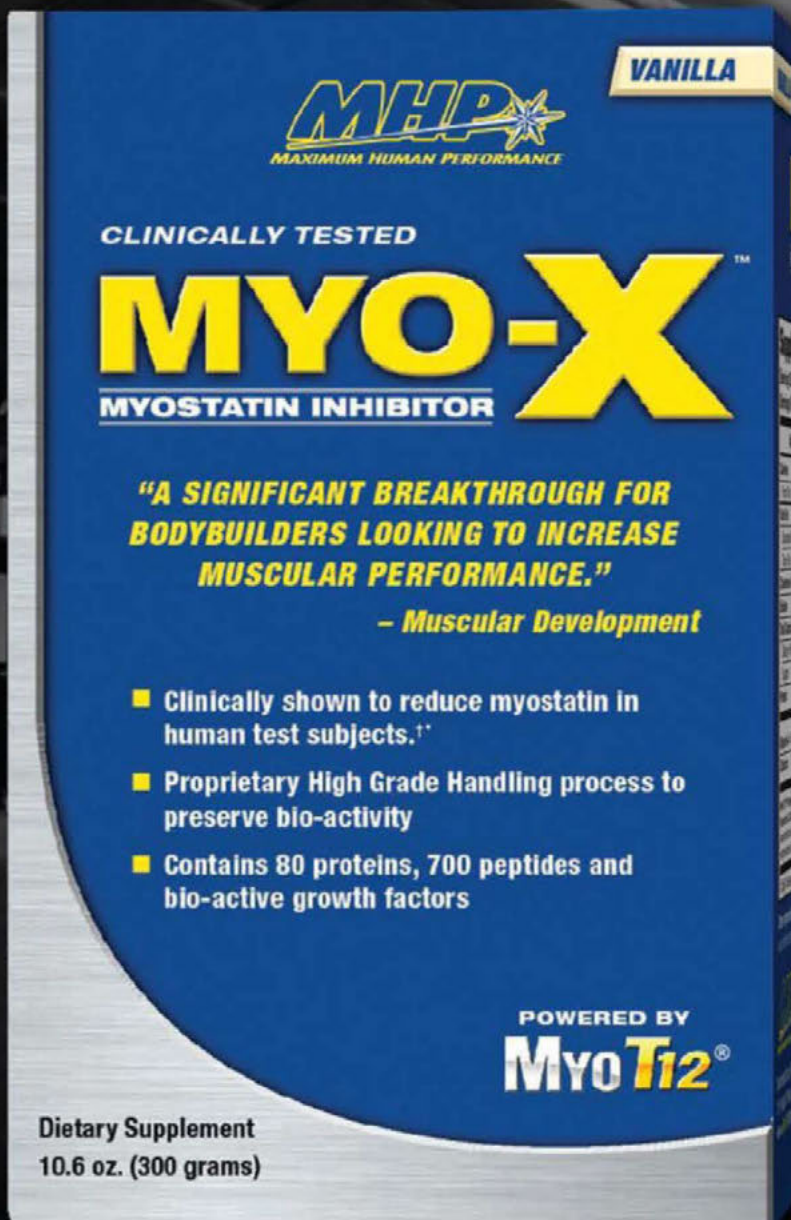
✓ **4X Greater Increase
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Your quest for building muscle may finally be realized. In a recent landmark clinical study at the University of Tampa Human Performance Laboratory, the myostatin inhibitor MYO-X was shown to significantly enhance muscle growth in athletes. The placebo controlled study showed that subjects training only two times per week for 12 weeks significantly gained lean muscle mass. Subjects who supplemented with MYO-X daily were able to add up to 8 lbs. of lean muscle mass in just 12 weeks, while gaining an amazing 4 times greater increase in total muscle thickness as compared to control.

“**Subjects in the MYO-X study experienced significant increases in lean muscle mass and total muscle thickness while training only two days a week.**”

“The results of this study support enormous potential for the use of myostatin inhibitors by athletes looking to improve muscle mass and performance,” says Dr. Robert Ashton, M.D., Chief Medical Officer at MYOS Corporation, a biotech company that specializes in the science of muscle health. Myostatin is a potent catabolic limiting factor for growth. This natural negative growth factor protein exists in all of us, and works to limit muscle growth in a genetically predetermined pattern. Scientific evidence supports a correlation between reductions in myostatin and muscle growth. MYO-X has already been shown in clinical research to significantly reduce myostatin levels in human test subjects.

The result of this new study demonstrates that the myostatin inhibitor, MYO-X, is also a powerful one-of-a-kind muscle building supplement. Now you can take advantage of this new development in muscle building science with MHP's MYO-X.



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Scientific Evidence Supports The Benefits Of Myostatin Inhibition On Muscle*

Myostatin and the control of skeletal muscle mass.

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The effects of a myostatin inhibitor on skeletal muscle mass in trained males.

Lowery, R., et al., 2014, submitted for publication American College of Nutrition.

*These studies represent the scientific opinions and research related to myostatin reduction. For informational purposes only.

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EDITOR'S LETTER

BY STEVE BLECHMAN, Publisher and Editor-in-Chief

BRANCH WARREN THE COMEBACK KID

When you talk about building mass and packing on muscle, one name comes to mind: Branch Warren. He practically jumps off this month's cover. Branch is bodybuilding's Rock of Gibraltar—he's big, solid and permanent, and can never be broken. Branch's body has taken a beating over the years and he's had his share of injuries, but he always comes back stronger and better than before. Branch is big, bad and indestructible.

Branch is a larger-than-life role model—and not just for his massive physique that is the result of years of hard work in the gym. Branch is a role model for *every man* for everything that he stands for. Branch is a blue-collar, hardworking family man who puts in the work that's required to get the job done—and gets the job done. He wasn't blessed with the best genetics as a bodybuilder, but Branch trained hard and long at Metroflex Gym to be among the best bodybuilders in the world. And he is fortunate to have a supportive and beautiful wife, Trish, a pro Fitness champion, who is an integral part of Branch's enduring success. Branch Warren has it all—only in his case, he's got a lot more of everything than what most guys have.

Branch Warren is one of the hardest training, toughest bodybuilders to ever set foot on a bodybuilding stage. His work ethic and iron-willed determination have enabled him to rebound from serious injuries that would have ended the careers of lesser men.



**“HIS WORK ETHIC AND
IRON-WILLED DETERMINATION
HAVE ENABLED HIM TO
REBOUND FROM SERIOUS
INJURIES THAT WOULD HAVE
ENDED THE CAREERS OF
LESSER MEN.”**

Although Branch has won seven pro contests and placed second at the 2009 Mr. Olympia, some narrow-minded skeptics thought his career had peaked in 2012—but nobody told Branch. In “Branch Warren: the Comeback Kid” on page 88, the Texas Titan tells MD's Peter McGough how he got his butt back in gear to place an impressive sixth in the 2014 Mr. Olympia.

Where have all the great chests gone? Many bodybuilding pundits have noted the relative lack of chest development of today's pros and amateurs, compared to legends of the past such as Arnold Schwarzenegger, Lou Ferrigno and Franco Columbu. Some contemporary bodybuilders like Ronnie Coleman and Victor Martinez have displayed excellent chests, and this month MD pays tribute to another modern-day pec king. In “Your Guide to Monster Pecs! With IFBB Pro Akim Williams” on page 94, the rookie pro tells Ron Harris how he built his thick slabs of dense beef.

At six foot and 270 pounds on contest day, Dennis Wolf is one of the most massive men to stand under the bright lights on a bodybuilding stage—with a physique that many now consider a threat to four-time Mr. Olympia Phil Heath. Dennis knows a thing or two about building thick, massive muscle. So he's just the man to demonstrate 10 key exercises you can use to get huge

too. In “The 10 Best Lifts for Mass With Dennis Wolf – 2014 Arnold Classic and Arnold Classic Europe Champ” on page 104, The Big Bad Wolf guides you through exercises that will take you closer to your maximum size. MD’s comprehensive approach includes “The Best Diet for Building Mass” by Brad Schoenfeld, Ph.D, CSCS and “The Best Training Techniques for Muscle Mass” by Michael Rudolph, Ph.D.

Justin Compton and Jonathan De La Rosa are two young guns who are both known for their outrageous lower body development. Justin’s billowing quads have been compared to those of Arnold Classic champ Dennis Wolf, and Jonathan De La Rosa has legs, hams

and calves that are almost impossibly thick and dense. In “4 Wheel Drive: Justin Compton and Jonathan De La Rosa Talk Building Monster Legs” on page 114 we got these two 20-something champs together to find out how they built those killer wheels, and what advice they have for the MD readers looking to develop their own pair of sick quads and hams.

Last year was a banner year for bodybuilding. Mr. Olympia champion Phil Heath earned his fourth Sandow. Dennis Wolf won the Arnold Classic and the Arnold Europe, as he continued his rise to the upper echelons of bodybuilding. And under the direction of Jim Manion, the IFBB’s Professional League enjoyed increases in overall popularity, prize money, ticket sales and sponsor revenue. In “The 2014 IFBB Pro Bodybuilding Report Card” on page 122 Dan Solomon looks at the stories that created the most buzz.

The rest of the book is packed to the binder as usual— with all the latest cutting-edge research and information on bodybuilding by the industry experts and insiders who make it all happen. See you next month!



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- **Subjects gained 47% in bench press strength!***

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"My personal results were nothing less than outstanding as I lost 15.1 lbs of body fat (7.5% body fat) and gained 5.1 lbs of muscle in less than 8 weeks!"

Guillermo Escalante—Upland, CA

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Amber Bohnstengel—Clive, IA



"I gained 8.5 lbs. of lean muscle and lost 11.7% body fat. When I saw the results of my In Body scans after only 8 weeks of using MaxxTOR I was floored."

Andy Fidino—Eugene, OR

*"After only 8 weeks of using **MaxxTOR**, I gained 5.8 pounds of lean muscle and lost 10 pounds of body fat. I've also lost 6.2% of body fat since I started!"*

Julie McKell—Wesley Chapel, FL





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**NEWS & VIEWS
FROM THE WORLD
OF BODYBUILDING**

EIGHT ROOM



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MB PEOPLE

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HOW I SEE IT!

WITH **SHAWN RAY, DORIAN YATES AND KEVIN LEVRONE**

Muscular Development is proud to bring you "How I See It," featuring three IFBB Hall of Fame bodybuilders, and legends of the industry that we are honored to have on Team MD. Between Shawn Ray and Kevin Levrone, they have a total of six runner-up finishes at the Mr. Olympia, and Dorian Yates won the Mr. Olympia title six consecutive times.

"WE HAVE SEEN MANY ADVANCES IN THE AREAS OF EXERCISE EQUIPMENT AND SCIENCE, NUTRITIONAL KNOWLEDGE, AND SUPPLEMENTATION OVER THE PAST FEW DECADES. WITH THAT BEING SAID, DO YOU BELIEVE THE SAME METHODS YOU USED TO GAIN MASS IN YOUR EARLY YEARS OF TRAINING ARE STILL EFFECTIVE TODAY? OR WOULD YOU DO THINGS VERY DIFFERENTLY IF YOU WERE STARTING OUT NOW?"

SHAWN RAY

The answer is basic and simple. I used the resources that were available to me when I was heavy in the game, and never wavered from the belief that you get what you give. I don't like to refer to myself as "old school." However, I was of the opinion and still am that the same tools available to build the Hall of Fame physiques of Sergio, Arnold, Zane and Haney were also available to me if I only applied those tools and had the proper "mindset."

You see for me, all the sports technology, sciences, foods, trainers, gurus and the like will always be a revolving door of improvement, simplification and money. The more things change, the more expensive it becomes to try to keep up with those changes. However, I am of the opinion that the true champion will adapt and excel only from the belief and application that he/she thinks they can become the best with the tools available to them, however archaic the tools may be. There are no replacements for free weights, dumbbells, protein, carbohydrates, fats, rest and recovery, and there will never be one for "common sense combined with an unrelenting desire to win!"

My meals were basic and simple, inclusive of muscle-building foods combined with lots of water, rest and recovery. I would train as if my life depended on it, as well as my livelihood, which allowed my training intensity to take me places never imaginable as a teenager hoping to one day be great. I became a Teenage National and world champion by the age of 20 through sweat and desire. My training consisted of using the exact same tools our sport's crown

jewels used to make themselves immortal. I didn't try to reinvent the wheel to make things easier for me, or to make the process go faster to become a winner sooner in my career. I was a driven athlete who stuck to the basic mechanics of bodybuilding just as Arnold, Zane and Haney did. These guys were competing in different decades than I was, yet their training principles and eating habits were just as relevant in the early '70s as they were to me throughout the '90s and into the 21st century!

Athletes today are being "brainwashed" by a lot of the new and modern training ideas and principles as if they will create the Super Bodybuilder of the Future. However, it comes at a price, and the athletes are the ones having to pay the bill! For some reason, the simple basics of learning how to eat, train and supplement the diets of a pro bodybuilder have been turned over to the new age gurus and trainers who take the "thinking" out of contest prep for the athlete. The athletes are then told what to eat, when to eat, how to train, what to use when training, which equipment is best suited for their bodies, and which contests are best for their ambitions. All this from the guru, who then hands them a bill for payment of services rendered without questions or intrigue from the athlete who just wants to win. Certainly we have progressed in the knowledge and wisdom of which



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NUTRITION

THE **WEIGHT ROOM** *HOW I SEE IT!*

WITH SHAWN RAY, DORIAN YATES AND KEVIN LEVRONE

protein sources and supplements are most beneficial to our bodies, and we have come a long way in the area of new gym equipment development, but I can categorically tell you that I personally long for the "look and appeal" of the past, that had athletes that appeared to be cut from hard work of brick and mortar instead of synthetic oils and machines. I would not change a thing I did back in the day, because what I did worked for me, and it worked for all those before me with respect to mass and detail!

Sometimes keeping things simple and basic is better than "changing with the times." Just because a trainer, doctor or guru

says something is better or best because it's new, that doesn't mean it will automatically carry over into the finished product. Give me Arnold, Zane or Haney back over the current crop of top guys we have today, and you will find more people desiring to compete again. New science, technology, trainers and gurus have helped destroy our sport's public appeal more and more the further we get away from the basic mechanics of what got us here in the first place.

Follow Shawn on Twitter: @sugarshawnray
Facebook: Shawn Ray

DORIAN YATES

First off, I don't believe there have been many truly significant advances since I began bodybuilding just more than 30 years ago. You would assume that equipment has made leaps in technology and efficiency in all that time, but I don't see it. The greatest advances in those areas were made in the 1970s and 1980s. Prior to that, you had a lot of Universal multi-stations and a fair amount of homemade equipment, a lot of which was actually quite good. All the equipment you see being used in the original Gold's Gym in the movie "Pumping Iron" was made by the late Joe Gold, and clearly it was good enough for Arnold to win six Mr. Olympia titles from 1970 to 1975.

It was only when Arthur Jones came along in that era with his Nautilus machines that exercise equipment became high tech and big business. Many of the pieces he produced in the late 1970s and early 1980s are still among the best ever made, and in fact I have a few of them at Temple Gym. His son Gary Jones designed the original Hammer Strength line, which also set a new standard. Their plate-loaded machines are now used in most gyms around the world, including mine. The 1980s and into the '90s was a golden age, during which you saw companies like Cybex, Body Masters, Icarian and several others all struggling to outdo each other with better and better machines. Since then, I can't really say there has been a whole lot of innovation.

As far as training methodology being more advanced now, I wouldn't agree at all. Most of the systems you see today include techniques that have been around a very long time. The only thing I would have changed about the way I trained, as I have mentioned

before, was to cycle my training more so that I wasn't pushing at 100 percent as often as I did. That probably would have prevented some or perhaps all my injuries. I will say that one new idea that might show promise is gene testing for muscle fiber types, which could theoretically help a bodybuilder select the most effective rep ranges for his particular genetic makeup. If this actually would have a large impact on his eventual results, I can't say for sure. One thing I would have given a fair trial was HIIT (high-intensity interval training) style cardio. I always did long, steady-state cardio in my competitive years. HIIT can burn more fat in less time, and I was always seeking ways to make my training as efficient as possible. That's why my workouts were shorter and less frequent than those of my peers, yet more intense.

In terms of nutrition, I don't think we've made many real advances. The way I ate was very effective at building size when I wanted to, and getting into excellent condition when it was time to diet. Supplements are definitely more varied these days, so I would take advantage of the newer types of products.

But all in all, look at the physiques at the amateur and pro level today versus those of 20-30 years ago. If in fact there have been tremendous advances leading to better equipment, training and nutrition strategies now, we would see an abundance of superior physiques today. Personally, I don't see that.

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THE **WEIGHT ROOM** **HOW I SEE IT!**

WITH SHAWN RAY, DORIAN YATES AND KEVIN LEVRONE

KEVIN LEVRONE

I wouldn't change a damn thing! The way I trained when I was starting out all those years ago is exactly what I would do now, down to the exercises, sets and reps. My training revolved around the three big lifts that are used in powerlifting, and that were used by every great bodybuilding champion, too.

Squats are the absolute best exercise you can do for the entire lower body. It's cool that we have all these leg press and hack squat machines now and even some that are called "squat machines," but none of them will ever take the place of good old-fashioned squats: a heavy bar on your back that you squat down deep and stand back up with.

The bench press is the best way to build both mass and power in the chest, as well as your shoulders and triceps. You can walk into some gyms today that have 20 or 30 different machines to work your chest. Can you honestly say any of them are even as good as, let alone better than, the flat barbell bench press?

And the deadlift—does it get any more raw and basic than that? You pick up a heavy bar off the ground! And in doing so, you develop rugged size and strength in your back from traps to spinal erectors, your quads, hams and glutes, and your rear delts and biceps. It's the closest thing to a full-body movement there is. There's no point in even trying to design a machine that does all that; it's not possible.

The vast majority of equipment that's come along in the last 20 years is meant to make training easier and more comfortable. Most so-called "gyms" are full of those, and many have even taken out most of their free weights! That's the opposite of what training is supposed to be, and it's certainly not going to build a superior physique. There's something to be said about having very limited equipment, such as nothing more than barbells, dumbbells and benches. That challenges you to do the toughest exercises and work your hardest. Think about the best Mr. Olympia champions of the past 40 years. Arnold trained like a warrior with plenty of cold steel, and so did Lee Haney. Dorian and Ronnie were complete beasts in the gym. See, that's what it's all about—your state of

mind and your hunger to be the best, not having a coach telling you what to do and using a lot of comfy machines. I like what Dorian said. If things have really advanced since my day, why aren't we seeing legions of superior physiques? Look at the lines, the muscle density, and the muscle quality of the stars of the '90s versus today, and tell me with a straight face they look better now.

As far as nutrition goes, what's really changed? Some have tried to overcomplicate it, when it's still a simple formula. You need to eat plenty of good, nutrient-dense food to recover and grow. Protein sources are still chicken, fish, red meat, turkey and eggs. Carbs are still carbs, fats are still fats. Eat more of it to grow, eat less of it to get leaner. I might catch some flak for this, but supplements are just an add-on, and they are a lot more important to those who don't eat enough or don't eat the right things. No champion became a champion because of supplements.

It's all about training, eating and sleeping—that's it. They are simple things, but few have what it takes to consistently adhere to that principle and work as hard as possible at doing the very best they can at all three. So sorry to say, there's nothing new under the sun, and if there is, it's not really "better" as far as I can see.

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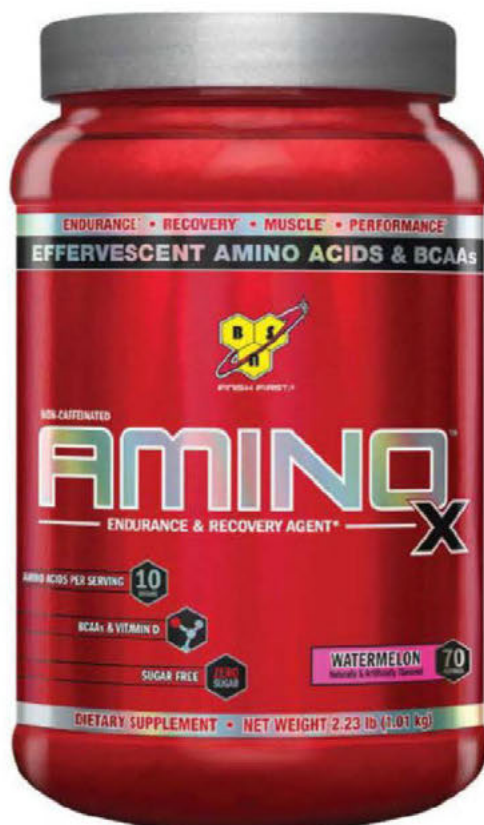
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NEWS AND INFO FROM AROUND THE WORLD

Around the world in 15 days?! That's what it was like for guys like Roelly Winklaar, Dexter Jackson and Steve Kuclo in October. After the 50th edition of Joe Weider's Mr. Olympia, all eyes turned to Europe as the action moved from Madrid, ending in Finland, with several stops in between. To be exact, there were five shows in a little more than two weeks. Here's a look at some of the results from across the pond.



DUBAI — DUBAI PRO

Chalk one up for the 40-something crowd! In a move no one saw coming, Dexter Jackson took the win in Dubai, surpassing both Shawn Rhoden and Dennis Wolf. For the first time, we saw that the European tour belonged solely to no one. The game was on, and all eyes turned to the action in Europe wondering what would happen next, when Kai Greene was down to be in the mix in Prague.

1. Dexter Jackson
2. Shawn Rhoden
3. Roelly Winklaar

PRAGUE — EVLS PRAGUE PRO

The action took a different turn in Prague with Kai Greene showing up for prejudging looking soft and unready for competition. How far would they let the champ fall? We'll never know because Kai withdrew from the completion, to the dismay of many. It could be said that Kai dropping out opened the door for Dennis Wolf to take the win, but Wolf had already huffed, puffed and blown down the house that Kai built at prejudging. He didn't need anybody to withdraw.

1. Dennis Wolf
2. Dexter Jackson
3. Shawn Rhoden

ITALY — SAN MARINO PRO

Brutal is the only word fit to describe the schedule of the athletes moving from Prague to Italy. Less than eight

hours after the dust settled in Prague, the athletes found themselves on a chartered plane en route to San Marino. The tables were turned once again as Shawn Rhoden beat both Dexter Jackson and Dennis Wolf. Rhoden was the last man standing here, but Wolf led the pack with two wins in the tour. None of the three headed to Finland, so we'll have to wait until 2015 to pick up this rivalry. Anyone ready for the 2015 competition season besides me?

1. Shawn Rhoden
2. Dennis Wolf
3. Dexter Jackson

FINLAND — NORDIC PRO

Hats off to Roelly Winklaar for his win in Finland at the Nordic Pro. Most of the bigger names left the tour just after Italy. Roelly forged ahead and ended up taking the win. Now he rolls into the 2015 season with an early qualification.

1. Roelly Winklaar
2. Steve Kuclo
3. Johnnie Jackson

SPAIN — ARNOLD CLASSIC EUROPE

The European tour kicked off with the Arnold Classic Europe. Shawn Rhoden was highly favored going in with a third place finish at the Olympia under his belt, but Dennis Wolf didn't care who was favored. A near-flawless version of Wolf showed up in Madrid, and Rhoden was relegated to second. Roelly Winklaar nabbed the first of what would become five top five finishes in the start of a grueling run of competitions.

1. Dennis Wolf
2. Shawn Rhoden
3. Dexter Jackson

GLOBAL GIRL OF THE MONTH Vladimira Krasova

Vladimira Krasova, hailing from the Czech Republic, found her way once again to the Bikini Olympia stage just a few short weeks ago. She's been working hard on refining her stage presence. The first time we saw Vladimira on the pro stage, she stood out for her lack of stage presence, never once cracking a smile. Now a year later, she smiles from ear-to-ear and exudes personality, as a Bikini pro should. She was rewarded for her effort, moving from 16th place last year to 13th, placing her above the 12 ladies tied for 16th.



My crew has been hard at work for the last few weeks, traveling the globe with no end in sight! Are they complaining? Not on your life! Team MD loves covering bodybuilding! As I sit here writing this, I'm fresh off visits to Madrid, Prague and Finland. If you want to know where we're headed next, drop me a line. I'm always listening and pride myself on answering each and every email I receive! It may take me a while, but I get to each and every message! adina@musculardevelopment.com



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– jdsnyds, Hermosa Beach, CA
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– boydenbody, Los Angeles, CA

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EAST COAST MECCA REPRESENTS!

We say that "legends are built at the East Coast Mecca" and it was proven this past September at the 50th Mr. Olympia in Las Vegas, NV. The hard training athletes regularly seen at Bev Francis Powerhouse Gym took on the best in the world and New York's finest made us damn proud! A huge congratulations to Juliana Malacarne, the 2014 Olympia Physique Champion!



Kai Greene -
Mr. Olympia - 2nd



Victor Martinez -
Mr. Olympia - 8th



Juan Morel -
Mr. Olympia - 10th



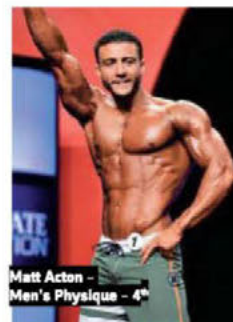
Jon De La Rosa -
Mr. Olympia - 14th



Sadik Hadzovic -
Men's Physique - 2nd

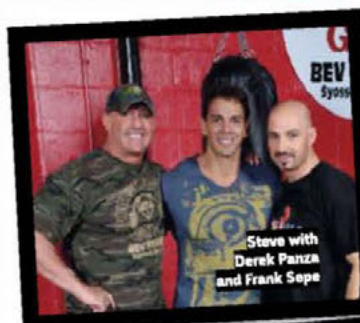


Juliana Malacarne -
Women's Physique - 1st



Matt Acton -
Men's Physique - 4th

HERE ARE SOME OTHER SIGHTS FROM AROUND THE EAST COAST MECCA...



Steve with
Derek Panza
and Frank Sepe



2014 Mr.
Olympia
Phil Heath



Max Charles and Co. always
go hard and heavy!



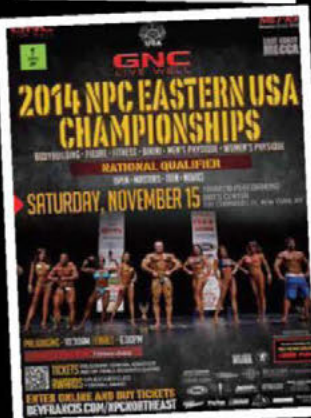
Big Steve with Victor
and Busta Rhymes

UPCOMING CONTEST SCHEDULE

2015

APRIL 4, 2015: NPC New York Metropolitan Championships (New York, NY) **ENTRY FORM & TICKET SALES OPEN DECEMBER 1!**

MAY 9, 2015: IFBB New York Pro Championships (New York, NY) **TICKET SALES IN JANUARY 2015**



Keep up with all of the news at the East Coast Mecca and the NPC NORTHEAST by following us on Facebook ([facebook.com/bevsgym](https://www.facebook.com/bevsgym)) and check out www.bevfrancis.com for the complete contest schedule, entry forms and ticket sales!

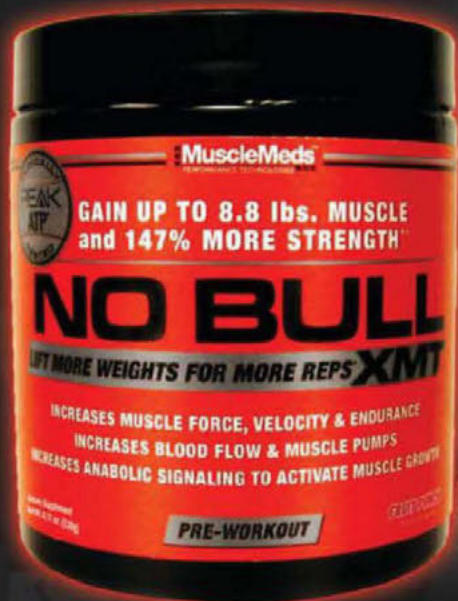
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EXCESS ACCESS

It's a much different landscape in today's bodybuilding world than it was growing up in the 1970s. I can remember vividly going to the grocery store and thumbing through the muscle mags, looking at these larger than life physiques, articles from your favorite superstars, and page after page of advertisements of all the courses you could send for— Danny Padilla's "Giant Killer" arm routine, the Oak's massive chest and back workout, Mike Mentzer's "Heavy Duty" system of training.

This was the closest you could get to a pro bodybuilder and any interaction with them, other than writing a fan letter to their P.O. box, which was usually provided in the back of the magazine. Maybe you would get a response, more likely you would not. The only other way you could see these guys was to actually go to a competition if you happened to live in a place like New York City, which had the show. I was in upstate New York (Rochester) and being a young teen at the time, didn't have the money or the ability to travel. Bottom line is you waited, and waited, and waited ... and **FINALLY**, the magazine came out a few months later with the results

and pics. I looked at those mags so much I wore out the ink on the cover, meticulously combing through every page wondering how cool it would be to look like these pros.

There was a mystique about these guys I looked up to. Even though there were articles I read until I knew them word for word, only limited information was ever put out about their family life, their private side away from the stage. They were gods, rock stars, movie stars. You put them on a pedestal and admired them. Whatever you didn't know, you filled in with your imagination, and it was always good.

Fast forward to the present. Gone are the days where you had to wait for a muscle mag to appear on the newsstand. The Internet brought instant results, pictures and coverage and it also brought the ability to connect with some of your favorite pros. Forums and boards and chat rooms all offered a chance to actually correspond and receive acknowledgment from these previously untouchable beings. While this seemed to be a great thing, was something lost in this? Taking out the obvious naivety that goes hand in hand with youth, it **WAS** a chance to learn more about them **PERSONALLY**... but was that a good thing?

Much like movie stars in the golden age and even into the 1980s, you didn't know every single detail (good or bad) about their lives, just what you saw on the big screen. Stars were held in the highest regard, as idols, as something you aspired to be. Now with social media, Twitter and Instagram being most notable, you can converse with TV and movie stars on a daily basis, be updated with an hourly report, know every intricate detail of how they're just like **YOU**.

Unfortunately, this is available to a 13-year-old as well. Kids have access to pretty much everything we do as adults. I'm not so sure this is a good thing. There is a certain innocence that has been lost to modern technology. To me, it's like telling my 8-year-old daughter that Santa Claus is a fake, that the tooth fairy is made up, there is no Easter bunny. Let kids be kids and enjoy the brief time we have growing up and believing in fairy tales and stories. Same goes to our world of bodybuilding; I didn't need to know every detail of every superstar I looked at in the mags. These were larger than life figures I idolized in my daydreaming days of being one of them.

As the old saying goes, too much of a good thing.... ■

THERE IS A CERTAIN INNOCENCE THAT HAS BEEN LOST TO MODERN TECHNOLOGY.

Bob Cicherillo is the IFBB Athlete Representative and one of bodybuilding's best-known personalities. He is an IFBB pro who placed first and Overall as a Super Heavyweight in the USA Championships and first in the Masters Pro World. Bob is host of over 20 bodybuilding shows throughout the season, including the Mr. Olympia.



THE VOICE

FEATURING **DAN SOLOMON**



TRASH TALK DAMNED IF YOU DO

DAMNED IF YOU DON'T

In the months leading up to September's Olympia Weekend, I was openly critical of the lack of pre-contest chatter. The *contenders* gave us little to get excited about, a sizable departure from those days when men named Kamali and Titus filled these pages with enough **TRASH** talk to fill that big blue dumpster behind your gym... and boy was it entertaining! Sadly, in recent years, the trend has shifted to a much friendlier, respectful tone among the world's elite bodybuilders. "Cocky" has been replaced with quiet confidence, and stare downs have been replaced with man hugs. Humility and self-deprecation has become the way of the new world, a noble concept for sure. Unfortunately, even nobility has a downside, as evidenced by the lack of sizzle heading into the 2014 Olympia.

As members of the media, my colleagues and I often tried to create fireworks, but it seldom led to anything more than a brief spark. So as the contest approached, I took to the airwaves on my PBW radio program and voiced disappointment over the lack of good old fashioned SMACK talk. At one point I even mentioned that professional golfers are now talking more trash than professional bodybuilders (true story). All of my attempts to get fans fired up about the biggest event of the year fell flat. I had failed.

And then we arrived in Vegas for the big weekend. In customary Olympia fashion, the festivities kicked off with the press conference,



an event that I've hosted on more than a few occasions, the first opportunity for fans to hear from their favorite bodybuilders. While it seldom delivers any headlines, there's always the hope that one of the contenders will fire a shot, metaphorically speaking, at one of his rivals. Unfortunately for the drama-seekers (like me), press conferences rarely provide anything more than a few carb-depleted sound bites... UNTIL NOW!!!

The 2014 Olympia press conference turned out to be a swift departure from the snooze fests of recent years. When moderators Bob Cicherillo and Dennis James opened the questioning by asking Kai Greene why he signed an Olympia poster with the inscription "2014 Mr. Olympia," it forced Phil Heath to fire back at his rival, explaining that such a move was a show of disrespect to the other 13 men who have **EARNED**

**'COCKY' HAS
BEEN REPLACED
WITH QUIET
CONFIDENCE,
AND STARE
DOWNS HAVE
BEEN REPLACED
WITH MAN HUGS.**

the right to sign their names that way. And it didn't end there. For the next 20 minutes, the two men went back and forth... and the crowd was loving it. It set the tone for a weekend that, until then, was void of theatrics. There were also a few "uncomfortable" moments. At one point, Heath was sharing his thoughts about the recent passing of his father, an emotional story that had changed the tone of the press conference. But before Phil could finish speaking, Kai interrupted, making it clear to everyone that he wasn't interested in Phil's sentiments. And THAT was the moment we all became a bit unsettled. Was it unfair of Kai to insert himself into such a personal moment for Phil? I'm not sure... but it certainly opened the door for criticism, especially from Kai's detractors.

Make no mistake about it— it was very entertaining. And for those who spent hard-earned money to be in Vegas for Olympia Weekend, "entertainment" is what they deserve. I spent several months complaining about the lack of fireworks. And suddenly, when the fireworks finally arrived, there were some complaining about a perceived lack of respect. I suppose trash talk is like so many other aspects of bodybuilding— **you're damned if you do... and damned if you don't.** ■

Dan Solomon is the Senior Features Editor at Muscular Development. For nearly 15 years, Dan has conducted many of the most prominent bodybuilding interviews of all time, including memorable visits with Arnold Schwarzenegger, Joe Weider and other icons of the sport. Creator of the popular "PBW Radio" program, Dan has served as moderator of the Olympia Press Conference and lead commentator at many of the world's biggest bodybuilding events. Follow Dan on Twitter @DanSolomon100 and tune in to PBW at store.musculardevelopment.com/pbw.



WITH PETER MCGOUGH

THE 2014 MCGOUGH AWARDS

A Random Selection of the Year's Notable Achievements

THE "GIFT MUST KEEP ON GIVING" AWARD

In winning his fourth Mr. Olympia title, Phil *The Gift* Heath has shown that, even not in his best shape, he has too much going on—in terms of thickness, detail, muscle roundness, shape and balance—to be beaten by his current rivals. However, he needs to equal, or surpass, the physique he presented at his first Olympia victory in 2011 to really start to nail down his legacy.

PHIL HEATH
2011 Mr. Olympia
Winner

THE "WILL HE DO A JAY OR A RICH?" AWARD

With his third consecutive Olympia runner-up placing, Kai Greene now joins the ranks of only two others who have achieved that: Rich Gaspari (1986-'88) and Jay Cutler (2003-'05). Rich never won the Olympia while Jay went on to win the first of his four Sandows in 2006.

THE "BODYBUILDING'S VERSION OF THE ALI-FRAZIER RIVALRY" AWARD

To Shawn Rhoden and Dennis Wolf, who keep on flexing face to face, with first one taking the upper hand, and then the other reversing the result next time out. In 2014 they met five times, with Dennis coming out on top on three occasions and Shawn twice.

THE "PROVING THAT BRAZIL IS FULL OF NUTS" AWARD

To the Arnold Brazil contest in April, where most were left scratching their heads wondering how fourth-placed Lionel Beyeke did not win.

THE "WOLF IN PEEPS' CLOTHING" AWARD

To Dennis Wolf, who is fast becoming the People's Champion. However, he is still dogged by being too depleted at the Olympia prejudging (where his torso from the front and biceps seemed to lack their normal size) and then coming in on Saturday as full as Yankee Stadium on Derek Jeter's last night. If he fixes that delay, then look out!

THE "WIP" AWARD

To Shawn Rhoden, who at age 39 is still proving he is able to make major improvements.

THE "THE CHARLIE SHEEN PR" AWARD

To Kai Greene, who blemished his copybook by outbursts at the Olympia press conference and prejudging, and then two weeks later dropped out of the Prague Pro show with an excuse that, unlike his physique, didn't hold much water.

THE "THREE AMIGOS" AWARD

It's been great to watch that threesome with Dominican Republic heritage—Victor Martinez, Juan Morel and Jon De La Rosa—joyously competing against each other and supporting each other through numerous contests this year.

THE FED-EX "MAN! DID HE DELIVER" AWARD

Back in 2004 when American Media Inc (AMI) went into partnership with the IFBB to stage the Olympia Weekend, AMI's CEO, David Pecker, made a public announcement that he would work toward making the prize money for Olympia athletes total \$1 million. For the 2004 Olympia weekend, the total prize money was \$420,000 (with \$120,000 going to the Mr. Olympia winner). In 2014 the total prize money was \$1.1 million with \$275,000 going to this year's Mr. Olympia. As far as the Expo is concerned, the 2004 rendition had just fewer than 200 booths, while this year more than 1,100 booths were on display.

THE "YOU SHOW ME YOURS AND I'LL SHOW YOU MINE" AWARD

A joint award to Phil Heath and Dexter Jackson. At the Superstar Seminar held the morning after the Olympia, Phil Heath did a hysterical posing impersonation of Dexter Jackson, and then Jackson did an equally outrageous impersonation of Heath. They should take this on the road.

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TRUE BRIT

THE BODYBUILDING HISTORIAN

THE "GREATEST COMEBACK SINCE LAZARUS" AWARD

To Branch "I don't give a damn what anybody thinks" Warren, who proved with his sixth place Olympia finish that the view that he is a battle weary war-horse no longer applies.

THE "PERFECT 10" AWARD

We must recognize 10-time Ms. Olympia champ Iris Kyle as the best competitor in bodybuilding history. Think about it— 10 Olympia titles! Iris retired after her latest victory and her record will never be broken by anyone across all Olympia divisions.

THE "ENOUGH OF THE ROBIN ROLE, THIS GUY'S A FULL-BLOWN BATMAN" AWARD

To Olympia promoter Robin Chang, who is an organizational genius. I was involved in the management of the Olympia from 2004 through '08 and saw firsthand what a mammoth task it was. Now it is so much bigger, and I'm in awe of how Robin pulls it all together.

THE "QUOTES FOR THE AGES" AWARD

To Dexter Jackson, who at nearly 45 years of age got fifth place at the Olympia and beat Shawn Rhoden for first place at the Dubai Pro and continues to defy the aging process. At the Superstar Seminar, when asked about possible retirement, he almost screeched, "Retirement? I'm still top five in the world— why would I retire?" He then said, "Put it this way, I train one hour a day and then spend the rest of my day driving around and playing Xbox. You get me another job that pays as well with that schedule and I may consider it."

THE "ADIOS ADELE" AWARD

It was bittersweet to see eight-time Fitness Olympia champ Adele Garcia retire onstage (injury ended her participation this year) at the division's finals and receive a standing ovation that brought her to tears.

THE "DANCING QUEEN" AWARD

The brilliance of Oksana Grishina was finally rewarded by her winning the Fitness Olympia title. The grace, agility, flexibility and choreography of her routines would attract mainstream attention.

THE "LONGER THAN AN ELEPHANT'S GESTATION PERIOD" AWARD

To Big Ramy, who continues to be an enigma. Having hit the scene with the force of a hurricane in 2013, the wind has been taken out of his sails a bit this past year. A chest infection didn't allow him to peak for May's New York Pro (although he won it) and a torn hamstring derailed a 100 percent effort at the Olympia, where he finished seventh. Will he fulfill what his 2013 potential seemed to be? Watch this space— in Ramy's case a whopping 285-pound space.

THE "AIN'T NUTHIN' BUT A PEANUT, DUDE'S GOT THE YOUNGEST HIPS IN THE BUILDING" AWARD

To the great one Ronnie Coleman, who hobbled onstage at the Olympia on crutches; the result of both hips being replaced a few weeks previously. I couldn't resist connecting his surgery to the fact that he recently celebrated his ninth child.

THE "EMCEE PUT THE HAMMER DOWN" AWARD

To Olympia emcee Bob Cicherillo, who did a fabulous job all weekend. He had to be particularly quick on his feet and tongue to handle the opening of the Saturday night finals that was suddenly revamped as it happened. Can you imagine standing in front of a 10,000-person crowd, being watched by a worldwide web audience, with NBC taping for delayed broadcast and being told the schedule had been thrown out the window and you had to "wing it"? Jeez, I couldn't do it, certainly not without wearing my brown pants. Great job, Bob.

THE "BODYBUILDING'S ULTIMATE IN-YOUR-FACE MOMENT" AWARD

The onstage face-off between Kai Greene and Phil Heath at the Olympia prejudging was the most dramatic confrontation in Olympia history, eclipsing the Arnold/Mentzer brouhaha of 1980, in which they never really got close to each other and occurred out of public view in the locker room.

THE "INVISIBLE MAN" AWARD

To William Bonac. Many were left bemused seeing him marooned down in 15th place at the Olympia.

THE "YO-YO MAN" AWARD

To Roelly Winklaar. Seventh at the 2013 Olympia (he should have been higher) he slumped to 12th this year, and although he maybe has the best arms around, this time out he had too much around the midsection. He needs to go from Roly-Poly to "Holy Moly!"

THE "JOJO GOT HIS MOJO WORKING" AWARD

Best posing of the year was JoJo Ntforo posing at the Mr. Olympia to the "Conquest of Paradise" from the movie, "1492." Every move was synchronized in time with the music and he hit his shots in tandem with the peaks of the soundtrack. Every transition was classically executed and the whole routine just flowed. Great stuff. This is how all the guys should pose.

THE "CHRISTIAN MEETS THE LION" AWARD

To Mike Christian and the Lion of Lebanon, Samir Bannout, hanging out backstage at the last Olympia. I hadn't seen Christian (best Olympia placing, third in 1986) for about 15 years. He just disappeared from LA, and given his turbulent past I feared that he was in a bad state. Well I found out the state he was in was Texas and he looked great. As soon as he saw me, he came across with that big smile and just about lifted me off my feet. He's the same old Mike— the Clown Prince of bodybuilding.

THE "JUSTIN TIME" AWARD

To 26-year-old Justin Compton, who became the breakthrough athlete of 2014, by winning the Europa Show of Champions back in April, and is showing an old-school head on young shoulders approach by bypassing the 2014 Olympia in order to make major improvements before his next outing: March's 2015 Arnold Classic.

THE "IN THE FOOTSTEPS OF JOE WEIDER" AWARD

To Muscular Development publisher Steve Blechman, who continues to give fans the best print and online experience in bodybuilding and still burns with a passion for the sport reminiscent of my old boss Joe Weider. ■



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BY ADINA ZANOLLI

Well, Team MD made it through the European Tour! It's been a whirlwind couple of months for Team MD, but things have settled down enough for us to start taking a look at some new and exciting projects. Here's just a small look at what's going on now at www.musculardevelopment.com.



EUROPEAN TOUR PHOTOS

Contest season did not end with the Olympia. On the contrary, the weeks following found five shows in Europe alone. **SHAWN RHODEN** beat both **DEXTER JACKSON** and **DENNIS WOLF** at the Olympia. In Europe, Dennis Wolf beat them both in Madrid, Dexter beat Shawn in Dubai, and Shawn beat them both in Italy! Are you caught up?! If you want to see what a few days can do to a physique, check out the photos from all of the European Tour in our contest gallery. You'll want to choose *Contest Pictures* from the *Contest* dropdown menu off the home page. There you'll find pictures from the Arnold Classic Europe, Dubai Pro, EVLS Prague Pro, San Marino Pro and the Nordic Pro. All of the shows took place in two weeks' time, some shows less than 24 hours apart.

PAPARAZZI PHOTOS

One of my favorite things to look through at the MD website is the paparazzi photos, especially for shows I don't get to attend in person. There's no better way to see what's going on behind the scenes. In the paparazzi section, you'll find candid shots of every part of a contest weekend—athletes at their best, their funniest, and sometimes their worst! If they're too bad, we won't post them. If they're just funny, oh yes, we will! To find them, open up any contest gallery and look to the uppermost right for *Paparazzi Galleries*.

EVAN CENTOPANI AND MD 101

As promised, our MD 101 series is in full swing! What is MD 101? It's a series of videos where athletes give detailed information on how they built their best parts, or in some cases, how they turned weaknesses into strengths. If you are a fan of Evan, you'll want to check out his videos—no one is better at giving instructions. We'll be showcasing **STEVE KUCLO** in the weeks ahead, focusing on lower body. Likewise, **JOHNNIE O. JACKSON** will detail how he built his stellar upper body. This isn't a series where one athlete fits all! We're bringing you the best of the best, and focusing on the standout parts for each athlete.



MOVING IN TO 2015

We're looking ahead into 2015, with plans on covering more shows, bringing you more videos, and refining what we're already doing. We're looking to give you a bigger look into the life of a pro in 2015. With that in mind, we'll be bringing you more lifestyle videos.

In the weeks ahead we'll be following **GUY CISTERNINO** on a hunt, and **STEVE KUCLO** to the fire station. We'll be spending time with each Team MD athlete throughout the year. Want to know what they do when they're not in the gym? You'll find out!

HAPPY ANNIVERSARY, NATE!



If you like what you see at the MD website, there's one guy you should be thanking—Nate Childers. Nate has been on the job a year now, full time that is. He's been an integral part of MD for much longer. Websites don't sleep, and neither does Nate. He's on the job 24/7/365. Congrats to Nate on a job well done.



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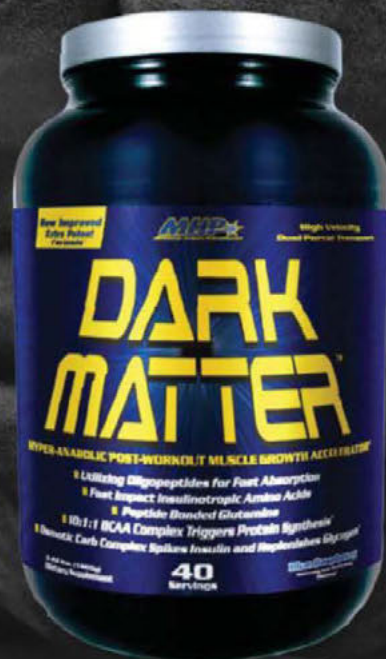


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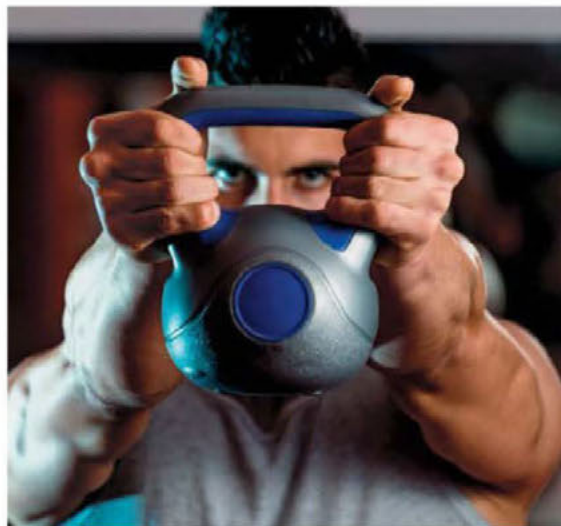
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CHAIN TRAINING PROMOTES STRENGTH

CHAIN TRAINING— ALSO CALLED ACCOMMODATION RESISTANCE— INVOLVES ATTACHING CHAINS TO EACH END OF AN OLYMPIC WEIGHTLIFTING BAR. Much of the chains are coiled on the ground at the beginning of an exercise such as a squat or bench press. The chains come off the ground as the exercise progresses, which increases the resistance by effectively increasing the weight lifted. A study by scientists from Iran, Ohio State University and Texas A&M University found that chain training was superior to traditional weight training for building lower body strength. However, chain training provided no additional benefit in building upper body strength and power or lower body power. This was a small study conducted for four weeks, so we need more research to adequately assess this technique. (PeerJ, published online DOI10.7717, 2014)



MECHANICS DETERIORATE During High-Rep Squat Workouts

CROSS-TRAINING WORKOUTS ARE EXTREMELY POPULAR. THESE PROGRAMS TYPICALLY INVOLVE PERFORMING HIGH REPS OF THREE TO FIVE EXERCISES AS EXPLOSIVELY AS POSSIBLE. The safety of these programs has been questioned because form usually breaks down with fatigue, which increases the risk of injury. A University of Connecticut at Storrs study led by David Hooper and Bill Kraemer found that squat biomechanics deteriorated during a 55-rep squat workout. Hip involvement decreased with fatigue, which placed greater loads on the knee joint and spine. These changes diminish the training effect of the exercise and increase the risk of injury.

The safety of squats has been questioned for more than 50 years. The National Strength and Conditioning Association, in a position stand, stated that squats are safe if performed correctly. Clearly, technique breaks down during high-rep squat workouts, which place the spine and knees at risk and reduces the effectiveness of the exercise for building lower body strength. (Journal Strength Conditioning Research, 28: 1127-1134, 2014)

HIIT Plus Weight Training Improves Aerobic Capacity and Strength

A SERIES OF STUDIES SINCE THE 1980S HAS SHOWN THAT AEROBIC TRAINING INTERFERES WITH STRENGTH WHEN STRENGTH AND AEROBIC PROGRAMS ARE PRACTICED SIMULTANEOUSLY. However, Greg Cantrell and colleagues from the University of Oklahoma found that practicing high-intensity interval training (HIIT) with weight training improved maximal oxygen



consumption by nearly 10 percent and upper and lower body strength. A similar study by Mike Smith and co-workers showed that CrossFit training, involving high-intensity resistance training and aerobics, also caused positive changes in aerobic capacity, strength and body composition. (European Journal of Applied Physiology, published online January 5, 2014)

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MD TRAINING CUTTING-EDGE RESEARCH

Free Weights Cause Greater Anabolic Hormone Response Than Machines

AN ONGOING CONTROVERSY IN STRENGTH TRAINING IS THE RELATIVE BENEFIT OF FREE WEIGHTS VERSUS WEIGHT MACHINES. Gyms typically emphasize weight machines because they are more profitable and considered safer than free weights. Free weights and machines are not the same, even when they work the same muscle groups. For example, squats and leg presses appear similar, but squats are a closed kinetic-chain exercise, while leg presses are open chain. Closed kinetic chain means that the lower or upper body stays in contact with the ground during the movement. Free weights require more spinal stabilization, which increases the load of the exercises. Free weights also trigger a greater neural-hormonal response— according to a study led by Aaron Shaner and Disa Hatfield. Elevated anabolic hormones appear to promote muscle hypertrophy and strength. The researchers found that testosterone and growth hormone levels were greater following the squat than the leg press, even though the perception of effort during the exercise was equal. At least for large muscle, lower body exercises, free weights increase anabolic hormones more than weight machines. (Journal Strength Conditioning Research, 28: 1032-1040, 2014)



Training for Endurance and Strength

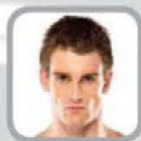
THIRTY YEARS AGO, SCIENTISTS DETERMINED THAT SIMULTANEOUSLY TRAINING FOR STRENGTH AND ENDURANCE INTERFERED WITH MUSCLE HYPERTROPHY AND STRENGTH. Researchers have argued about this since then. Riki Ogasawara from the University of Tokyo and colleagues, in a study on rats, determined that endurance and strength exercise activate different biochemical pathways in the cells. Strength training activates the mTOR pathway, which promotes muscle protein synthesis. Endurance training turns on the AMPK pathway, which increases the activity of mitochondria— the powerhouses of the cell. The researchers found that when doing endurance and strength training in the same workout, signaling for the second type of exercise would predominate. So, if your goal is to build muscle and strength, practice strength training after endurance training. If your goal is to build endurance, practice endurance exercise second. This study has important implications for all athletes. (American Journal of Physiology Endocrinology Metabolism, published online April 1, 2014)

ARE INCREASES IN ANABOLIC HORMONES DURING TRAINING NECESSARY FOR MUSCLE GROWTH?

ANABOLIC HORMONES SUCH AS TESTOSTERONE, GROWTH HORMONE, AND IGF-1 TRIGGER PROTEIN SYNTHESIS. Many recent studies on muscle physiology have tried to determine the optimal combination of sets, repetitions and rest between sets and workouts that will boost anabolic hormones. They also study supplements and dietary patterns that can increase these hormones. Daniel West and Stuart "Phillips from McMaster University in Canada concluded that post-exercise increases in anabolic hormones do not promote muscle hypertrophy. Studies should concentrate on training methods that increase muscle size and strength rather than measuring changes in anabolic hormones that presumably increase them. (Medicine Science Sports Exercise, 45: 2044-2051, 2013)



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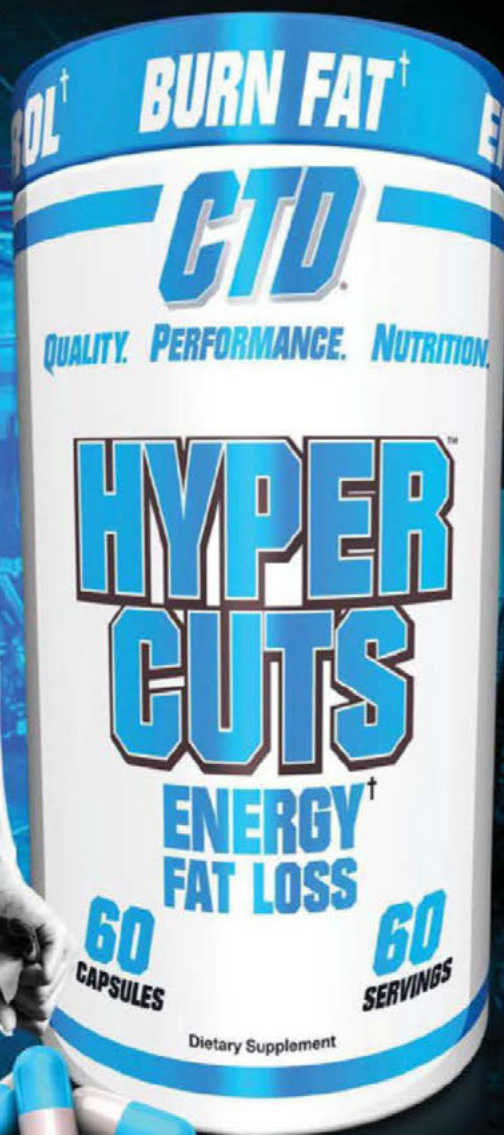
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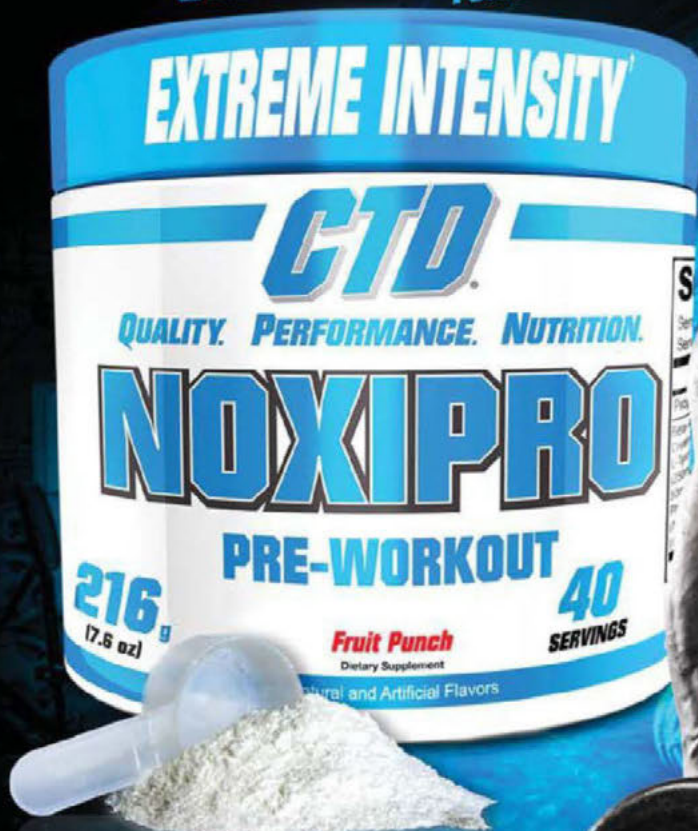


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The Skinny on BMI

BODY MASS INDEX (BMI) IS A MEASURE OF BODYWEIGHT THAT IS USEFUL FOR CLASSIFYING THE HEALTH RISKS OF BODYWEIGHT.

Body mass index is based on the concept that weight should be proportional to height. BMI is a fairly accurate mea-



sure of the health risks of bodyweight for average (non-athletic) people, and it is easy to calculate and rate ($BMI = \text{weight (kilograms)} / \text{height}^2 \text{ (meters)}$). Because BMI doesn't distinguish between fat weight and fat-free weight, however, it is inaccurate for some groups. For example, athletes who weight train have more muscle mass than average people and may be classified as overweight by the BMI scale. Because their "excess" weight is in the form of muscle, however, it is healthy. Further, BMI is not particularly useful for tracking changes in body composition—gains in muscle mass and losses of fat. Women are likely to have more body fat for a given BMI than men. BMI measurements have also over- and underestimated the prevalence of obesity in several ethnic groups. If you are an athlete, a serious weight trainer or a person of short stature, do not use BMI as your primary means of assessing whether your current weight is healthy. Instead, try simple methods for measuring body fat such as bioelectrical impedance or skinfold testing. (The New York Times, April 15, 2014)

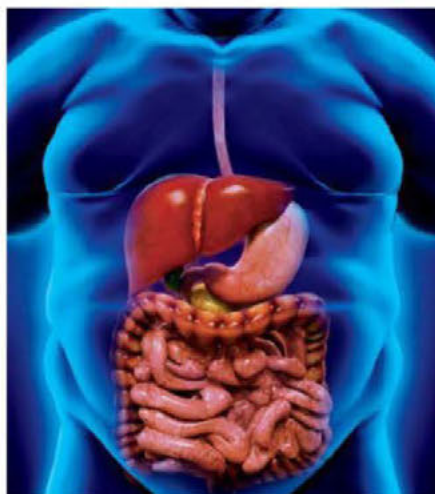


TURN UP YOUR BROWN FAT FURNACE

THE HUMAN BODY CONTAINS SMALL AMOUNTS OF A CALORIE-BURNING TISSUE CALLED BROWN FAT (BROWN ADIPOSE TISSUE, BAT) THAT CONVERTS FOOD ENERGY DIRECTLY INTO HEAT. White fat does the opposite—it stores energy. Brown fat accounts for as much as 10 percent of the fat mass in people living in cold climates, such as northern Finland. Individual differences in BAT content and activity plays an important role in human obesity. Energy metabolism works through a series of coupled reactions. This means that energy released by breaking down fats, carbohydrates and proteins is captured in other reactions, such as making ATP (a high-energy chemical) or storing fats and carbohydrates. Uncoupling occurs when the energy from food breakdown is released as heat instead of capturing it as ATP. Brown fat converts food energy directly into heat. Drug and supplement makers, such as Advanced Molecular Labs with the product Thermo Heat, are targeting uncoupling in brown fat and other cells to increase metabolic rate, which will help people control body fat. (Journal Internal Medicine, doi: 10.1111/joim.12255, 2014)

Nitric Oxide Promotes Weight Control

NITRIC OXIDE (NO) IS A CHEMICAL PRODUCED BY THE INNER LINING OF THE BLOOD VESSELS THAT REGULATES BLOOD FLOW. NO metabolism is regarded as one of the best markers of metabolic health and is critical for disease prevention, sexual performance and longevity. A review of literature by Brian Sansbury and Bradford Hill from the University of Louisville concluded that NO is critically important for the regulation of body fat, obesity and insulin metabolism. NO is involved in appetite control, blood sugar regulation, inflammation, regulation of fat synthesis and breakdown, and the production of blood sugar in the liver. Regular physical activity is the most important lifestyle factor enhancing the production of nitric oxide in the body. (Free Radical Biology and Medicine, 73: 383-399, 2014)



Gut Microbes Might Cause Low-Grade Inflammation and Obesity

OBESE AND LEAN HUMANS HAVE DIFFERENT GUT MICROBE POPULATIONS, WHICH MIGHT ACCOUNT FOR INDIVIDUAL DIFFERENCES IN WEIGHT GAIN AND LOW-GRADE INFLAMMATION. The human gastrointestinal tract contains more than 100 trillion microbes. Imbalances in gut microbes have been linked to obesity, inflammation, immune system breakdown, bad breath, gum disease, coronary artery disease, cancer, back pain, allergies and autism—according to a literature review by Giovanni Tarantino from the Federico II University Medical School in

Naples, Italy. Bacteria-laden foods called probiotics, containing bacteria such as *Lactobacilli acidophilus* and *Bifidobacteria*, may be the next big health food craze because they stabilize the microbe population in the gut. (Journal Clinical Endocrinology Metabolism, 99: 2343-2346, 2014)



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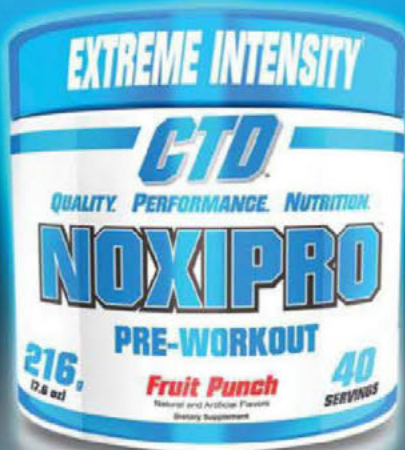
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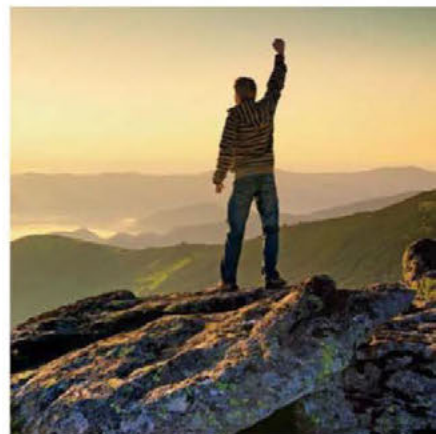
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MD **FAT LOSS** CUTTING-EDGE RESEARCH

Altitude Promotes Weight Loss

LIVING AT ALTITUDE PREVENTS OBESITY— according to a study led by Jameson Voss of the U.S. Air Force School of Aerospace Medicine at Wright-Patterson Air Force Base in Ohio. Obesity was 41 percent less likely in people stationed at high altitudes above 6,400 feet compared to people stationed below 3,200 feet. Obesity rates decreased with increasing altitudes, which means that altitudes of 9,000 feet (Aspen, Colorado) would be more effective for preventing obesity than 6,400 feet (Squaw Valley, California). Studies conducted at a laboratory on Pikes Peak, Colorado (14,110 feet) by George Brooks from the University of California, Berkeley showed that altitude decreases appetite and slows nutrient absorption in the gut. (PLOS ONE, 9(4): e93493, 2014)



HIIT Reduces Food Intake

EXERCISE USUALLY INCREASES APPETITE AND FOOD INTAKE. That's not true of high-intensity interval training (HIIT). A study on obese men from the University of Western Australia showed that HIIT reduced post-exercise food intake for 38 hours compared to a moderate-intensity (60 percent of maximum effort) workout. Following HIIT, test subjects had lower levels of ghrelin, a gut hormone that increases appetite. The men tolerated HIIT well. This type of training might be appropriate for people with limited time for exercise or those who want the workouts to end sooner. However, HIIT is not for everyone because it is extremely strenuous. (International Journal Obesity, published online July 9, 2013)

Sleep in a Cold Room to Increase Brown Fat Activity

BROWN FAT (ADIPOSE) IS A METABOLICALLY ACTIVE TISSUE THAT DISSIPATES ENERGY AS HEAT RATHER THAN STORING IT AS FAT. It helps humans acclimatize to cold, and may be critical for weight maintenance. Researchers from the National Institutes of Health, led by Francesco Celi and Paul Lee, found a novel way of turning on brown fat and increasing caloric expenditure: sleep in a cooler room. Five men slept in one-month blocks at room temperatures varying between 66 and 81 degrees. Sleeping in the cold room doubled brown fat activity and improved insulin sensitivity and blood sugar regulation. Sleeping in a slightly cooler room might be an effective way to increase metabolism and promote weight loss. (Diabetes, Published Online June 22, 2014)



CAPSAICIN *Makes You Feel Full*

CAPSAICIN IS A CHEMICAL FOUND IN RED CHILI PEPPER USED TO MAKE PAPRIKA, WHICH IS A SPICE USED IN CHILI AND MEXICAN FOOD. It reduces appetite and calorie intake, and helps promote weight loss by releasing serotonin, a hunger-suppressing hormone, in the gut. A study from Maastricht University in the Netherlands found that supplementing capsaicin increased satiety and fullness, and prevented overeating in people in energy balance (balance between calories in and calories out). Capsaicin also decreased the desire to eat after dinner during caloric restriction. While we have

little information about the long-term effects of capsaicin, it appears to decrease appetite, reduce caloric intake and increase metabolic rate. (Appetite, 77: 46-51, 2014)





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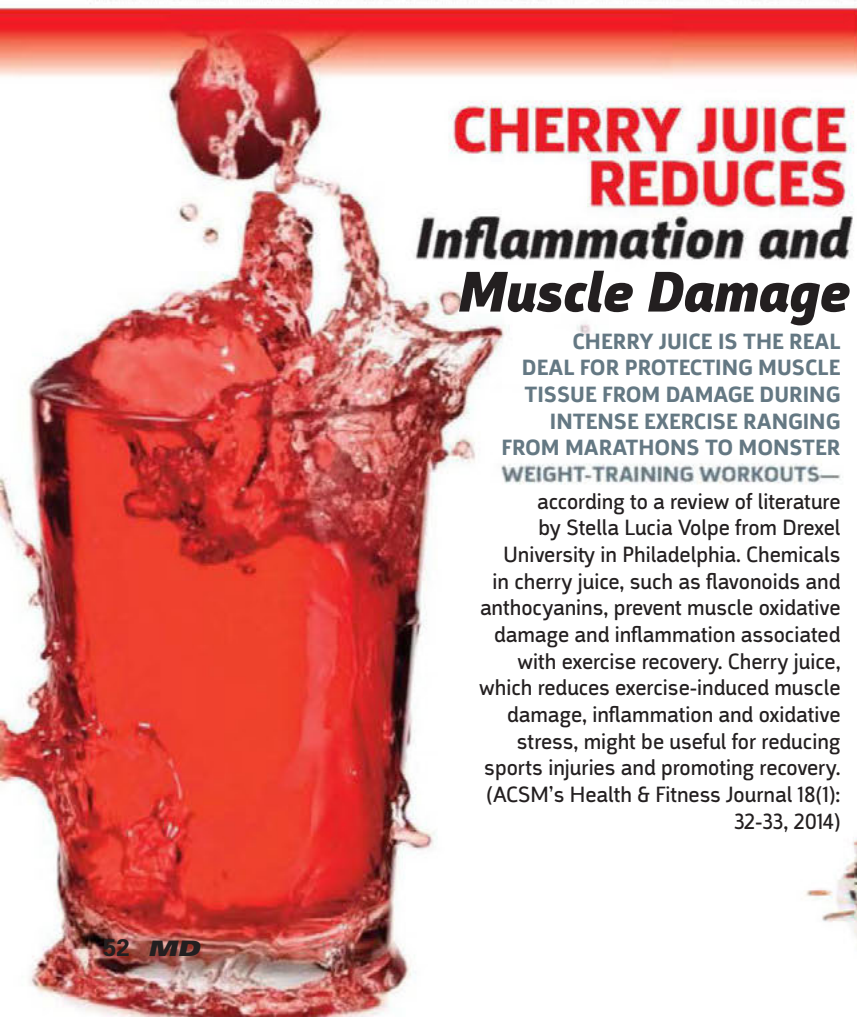


HIGH RED MEAT INTAKE LINKED TO LOW SPERM COUNTS

A HARVARD SCHOOL OF PUBLIC HEALTH STUDY LED BY MYRIAM AFEICHE FOUND THAT CONSUMING PROCESSED MEATS WAS LINKED TO REDUCED SPERM COUNTS AND ABNORMALITIES IN SPERM SIZE AND SHAPE, compared to men who ate less processed red meat. Sperm quality is directly related to fertility—the capacity to trigger pregnancy. Researchers found that eating fish was linked to better semen quality. The results were not linked to the intake of total fat or saturated fat. This study did not show that eating processed red meat caused fertility problems—only that they were associated. (*Epidemiology*, 25: 323-330, 2014)

EAT PROTEIN THROUGHOUT THE DAY

THE RECOMMENDED DAILY ALLOWANCE FOR PROTEIN IS 0.8 TO 1.5 GRAMS PER KILOGRAM OF BODYWEIGHT. Most people consume more protein at night than during the day. This is a mistake—according to a study led by Douglas Paddon-Jones and Madonna Mamerow from the University of Texas Medical Branch at Galveston. They found that 24-hour protein synthesis was higher when protein was consumed evenly throughout the day than when it was consumed more at night. This study used sophisticated radioactive tracer methods to measure protein synthesis. Strive to consume protein throughout the day and not just in the evening. (*Journal of Nutrition*, 144: 876-880, 2014)



CHERRY JUICE REDUCES Inflammation and Muscle Damage

CHERRY JUICE IS THE REAL DEAL FOR PROTECTING MUSCLE TISSUE FROM DAMAGE DURING INTENSE EXERCISE RANGING FROM MARATHONS TO MONSTER WEIGHT-TRAINING WORKOUTS—

according to a review of literature by Stella Lucia Volpe from Drexel University in Philadelphia. Chemicals in cherry juice, such as flavonoids and anthocyanins, prevent muscle oxidative damage and inflammation associated with exercise recovery. Cherry juice, which reduces exercise-induced muscle damage, inflammation and oxidative stress, might be useful for reducing sports injuries and promoting recovery. (*ACSM's Health & Fitness Journal* 18(1): 32-33, 2014)

The Health Benefits of Wild Rice

WILD RICE IS A POPULAR FOOD IN EAST ASIA AND IS GAINING A FOOHOLD IN THE UNITED STATES. It is high in vitamins, minerals, protein, starch, fiber and antioxidants. The U.S. Food and Drug Administration (FDA) recognizes it as a whole grain. A review of literature by scientists from the University of Manitoba in Canada concluded that wild rice, when consumed as part of a healthy diet, contributes to health by supplying antioxidants, reducing blood fats and supplying a good source of fiber. Wild rice has a greater antioxidant capacity than the same amount of white rice. In animal studies, long-term consumption of wild rice reduced the risk of cardiovascular disease. Wild rice is a heart-healthy food. (*Nutrition Reviews*, 72:227-236, 2014)



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to make new proteins following meals high in proteins and amino acids. The amino acid leucine is an important nutrient that promotes protein synthesis in your muscles. Leucine activates the mTOR pathway, which triggers muscle growth, and serves as a building block for muscle protein synthesis. Combining whey and leucine supplements with resistance exercise promotes muscle protein synthesis and prevents atrophy. (Nutrition, published online January 10, 2014)

Mediterranean Diet Helps Moderate Abdominal Fat Deposition

ABDOMINAL FAT DEPOSITION IS LINKED TO HEART ATTACK, STROKE AND SOME TYPES OF CANCER. It is so

common in men and women that it is considered an inevitable part of getting older. Spanish researchers found that people who followed a Mediterranean diet showed less abdominal fat gain during a 10-year study. The Mediterranean diet is high in fruits, vegetables, olive oil, nuts, fish, poultry and lean meats. The study examined metabolic changes in more than 3,000 men and women between 2000 and 2009. People who followed the diet most had the lowest increases in abdominal fat. (British Journal of Nutrition, 111:1481-1487, 2014)



Vitamin D Promotes Muscle Function

VITAMIN D IS SYNTHESIZED IN THE BODY IN A REACTION INVOLVING SUNLIGHT. Vitamin D can also be consumed in the diet by eating fatty fish, mushrooms and supplements. Several recent studies have linked low vitamin D levels to poor bone health, muscle weakness and deficiencies in reproductive hormones. However, the only health claims allowed by government agencies in the United States, Europe and Canada for vitamin D include reducing the risk of osteoporosis, preventing inflammation and promoting

normal muscle function. A review of literature by Rachele Pojednic and Lisa Ceglia from Tufts University in Boston reported that lower blood levels of vitamin D were linked to lower aerobic capacity and higher body mass index. Vitamin D activates genes and cell-signaling chemicals that are critical for muscle hypertrophy, strength and improved muscle performance. In older adults, maintaining adequate vitamin D levels might contribute to fewer falls. (Exercise Sports Science Reviews, 42: 76-81, 2014)

Whey Protein Supplements Boost Key Amino Acids

AMINO ACIDS SUCH AS LEUCINE, ISOLEUCINE AND VALINE ARE CRITICAL FOR PROTEIN SYNTHESIS AND MAINTAINING MUSCLE MASS, PARTICULARLY IN OLDER ADULTS. Scott Forbes and colleagues from the University of Alberta in Canada found that supplementing the diet with whey protein triggered additional increases in amino acids critical for muscle hypertrophy and the maintenance of muscle mass. Whey promoted anabolic metabolism without increasing glucose, insulin, testosterone, cortisol or growth hormone. Daily whey protein supplements are important for weight training and for older adults trying to prevent muscle loss. (International Journal Sports Nutrition Exercise Metabolism, 24: 188-195, 2014)



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Intense Training Can Cause Rhabdo

PEOPLE LIKE INTENSE TRAINING METHODS SUCH AS CROSSFIT AND HIGH-INTENSITY INTERVAL TRAINING BECAUSE THEY BUILD FITNESS QUICKLY, AND THE PROGRAMS ARE CHALLENGING AND INTERESTING.

Unfortunately, intense training also increases the risk of severe muscle injury that can be debilitating or even life threatening. Overzealous training can cause rhabdomyolysis (rhabdo), which involves destruction of muscle tissue that results from the release of the muscle cell contents into the bloodstream. Symptoms include fainting, cardiac arrhythmias, kidney failure, muscle pain and weakness, nausea and vomiting. The severity and risk of rhabdo increases with dehydration, eccentric exercise (negatives or lengthening contractions), trauma and even medically prescribed drugs such as statins. The incidence of rhabdo has increased alarmingly with the popularity of high-intensity training programs. Approximately 3 percent of people involved in physical training programs for the military, police and firefighters experience rhabdo. Physicians across the country have reported an increased incidence of rhabdo in ordinary people performing extreme physical training programs in health clubs. The exact percentage is unknown, but experts believe that the incidence is underreported. (The New York Times, January 4, 2014)

Intense Exercise Improves Blood Sugar Control

OBESITY AND PHYSICAL INACTIVITY PROMOTE INSULIN RESISTANCE, WHICH IS LINKED TO HIGH BLOOD PRESSURE, TYPE 2 DIABETES, ABNORMAL BLOOD FATS, ABDOMINAL FAT DEPOSITION AND BLOOD CLOTTING ABNORMALITIES. Insulin resistance is epidemic in the United States, particularly in the South and Midwest. Exercise improves insulin sensitivity and blood sugar control. A University of Virginia study led by Art Weltman found that a single bout of intense exercise improved blood sugar control better than moderate-intensity exercise or no exercise. The study examined prediabetic adults and showed the importance of regular intense exercise for promoting metabolic health. (Journal of Clinical Endocrinology Metabolism, 99: 220-228, 2014)



SLEEP APNEA Linked to Cardiac Sudden Death

SLEEP IS CRITICAL FOR LEARNING, FOCUS, REACTION TIME, METABOLIC CONTROL AND BODYWEIGHT MANAGEMENT. Lack of sleep triggered by sleep apnea can kill you. Sleep apnea is caused by airway obstruction during sleep, which disturbs sleep patterns and prevents deep sleep. Sleep apnea is linked to chronic inflammation and high blood pressure, both of which increase the risk of heart attack and stroke. Weight loss and the use of continuous positive airway pressure (CPAP) reduce blood pressure and C-reactive protein, a marker of inflammation. Large neck muscles increase the risk of sleep apnea, so most bodybuilders are at risk. You might have sleep apnea if you snore or are chronically tired and fatigued during the day. See your physician if you suspect you might have sleep apnea—it might save your life. (New England Journal of Medicine, 370: 2339-2340, 2014)

ROTATOR CUFF TEAR IN ONE SHOULDER *Increases the Risk of Injury to the Other Shoulder*

THE SHOULDER ROTATOR CUFF IS RESPONSIBLE FOR INTERNAL AND EXTERNAL ROTATION OF THE SHOULDER AND FOR SHOULDER STABILITY. Rotator cuff tears are extremely common in athletes. Bad bench press technique, for example, is a common cause of rotator cuff injuries. A study from University Hospital in Münster, Germany showed that people who injure the rotator cuff in one arm have a 68 percent higher risk of injuring the rotator cuff in the other arm. Shoulder function in the uninjured arm is diminished, even if the rotator cuff is not injured. People recovering from a rotator cuff injury in one arm should have their uninjured shoulder evaluated thoroughly. (The American Journal of Sports Medicine, 42: 826-830, 2014)



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Long Work Hours and Inadequate Sleep Linked to Heart Attacks

MEN WHO WORK MORE THAN 60 HOURS PER WEEK AND SLEEP LESS THAN SIX HOURS PER NIGHT INCREASE THEIR RISK OF HEART ATTACK BY 220 PERCENT— ACCORDING TO A STUDY FROM NATIONAL TAIWAN UNIVERSITY IN TAIWAN. The study compared 322 men with heart attacks against similar healthy men in the population. Factors such as smoking, body mass index, and work environment did not influence the results. The take-home message is that working too many hours or not getting enough sleep can kill you. (Cardiology, published online December 27, 2013)

Is Naproxen Safer Than Other NSAIDs?

REGULAR USE OF NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS) HAS BEEN LINKED TO AN INCREASED RISK OF HEART ATTACK. However, recent large population studies have found that naproxen (Aleve) is safer than other NSAIDs. The Drug Safety and Risk Management Advisory Committee of the U.S. Food and Drug Administration (FDA) concluded that naproxen was safer than other NSAIDs. This caused a controversy in the medical community. Critics of the advisory committee's position cautioned that we have limited data on the safety of naproxen compared to other NSAIDs. People should not overuse these drugs because of the possibility of increased cardiovascular risk. (Medscape, February 11, 2014)

Exercise Prevents Chronic, Low-Grade Inflammation

INFLAMMATION IS THE IMMUNE SYSTEM'S WAY OF DEALING WITH TRAUMA, BACTERIAL AND VIRAL INFECTION, AND IRRITANTS. SYMPTOMS INCLUDE PAIN, INCREASED TEMPERATURE OR REDNESS, SWELLING AND LOSS OF FUNCTION.

Most athletes are familiar with acute inflammation when they get a sprained ankle or torn hamstring. Chronic inflammation, on the other hand, is a prolonged, abnormal process that causes tissue breakdown and diseases such as atherosclerosis, cancer and rheumatoid arthritis. A review of literature by Robert Buresh from Kennesaw State University and Kris Berg from the University of Nebraska at Omaha concluded that moderate-intensity exercise can reduce chronic inflammation and improve metabolic health. Exercise promotes body fat control and reduces the production of immune system cells associated with inflammation. Overtraining, on the other hand, can increase inflammation. The average person should approach exercise like Goldilocks: too little promotes chronic inflammation; too much also promotes chronic inflammation; regular, moderate-intensity exercise is just right. (Strength and Conditioning Journal, 36 (4): 87-93, 2014)

ARE YOU OVERTRAINED?

OVERTRAINING IS AN IMBALANCE BETWEEN TRAINING AND RECOVERY.

The consequences of this condition can be severe and include decreased performance, injury, depressed immunity and psychological depression. Overtraining is a natural hazard of competitive sports. Coaches and athletes, in their quest for better performance, undertake intense training programs in the hope of gaining an edge over the competition. However, a fine line exists between programs that improve condition and those leading to overtraining. Training programs must be intense enough to improve fitness and skill, yet provide enough rest to ensure adequate recovery. Diagnosis and treatment of overtraining is as much art as science. (Current Sports Medicine Reports, 13 (1): 45-51, 2014)



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of trained power lifters, the tendency was for this type of more strenuous exercise to affect sleep adversely. In addition, long duration daytime exercise of moderate intensity has been shown to decrease GH and testosterone production during nighttime sleep. So, it is extremely important for athletes to get a deep and restful sleep because this is when healing, tissue repair, anabolic hormone production and muscle growth are maximized.

ZMA Buyers Beware: As a result of ZMA's world-wide success, there are now cheap imitation "Zinc Magnesium Aspartate" products available on the market. These knock-off ZMA products contain inferior ingredients and also often contain much lower dosages of zinc and/or magnesium. Please be aware that these imitation products are NOT the same as ZMA and may not produce the same results obtained in the ZMA study.

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HMB + ATP INCREASE Muscle Mass, Strength and Power

HMB (BETA-HYDROXY-BETA-METHYLBUTYRATE) IS A METABOLITE OF THE AMINO ACID LEUCINE. HMB PREVENTS PROTEIN BREAK-DOWN AND PROMOTES MUSCLE HYPERTROPHY. It also increases fat-free weight (mainly muscle) and decreases fat. ATP (adenosine triphosphate) is a high-energy chemical that participates in most cellular energy reactions. A study led by Jacob Wilson from the University of Tampa found that a supplement containing HMB and ATP administered daily during a 12-week study increased lean mass by 12.7 percent, strength by 23.5 percent, vertical jump by 21.5 percent and Wingate power (sprint exercise on a stationary bike) increased by 23.7 percent. The test subjects were involved in a high-intensity fitness program, during which two weeks were devoted to an intense program designed to create maximum fatigue. The experimental group continued to make gains during this difficult period. The study showed that HMB plus ATP is an effective performance-enhancing supplement. The study could have been improved by also measuring the effects of HMB and ATP separately. The researchers can do this at another time. (Journal Strength Conditioning Research, published online April 2014)

Whey Protein Plus Leucine Promotes Protein Synthesis in Older Adults

A SUPPLEMENT CONTAINING 20 GRAMS OF WHEY PROTEIN AND THREE GRAMS OF LEUCINE CONSUMED AFTER WEIGHT TRAINING WAS SUPERIOR TO AN EQUAL AMOUNT OF MILK PROTEIN FOR PROMOTING MUSCLE PROTEIN SYNTHESIS IN OLDER ADULTS. Muscle loss, a condition called sarcopenia, is a significant health issue in older adults. Sarcopenia interferes with mobility and quality of life, and decreases metabolic health by reducing one of the most active tissues in the body. Overwhelming evidence shows that older adults can help maintain muscle mass by consuming a supplement containing 20 to 30 grams of whey protein and three grams of leucine at least once a day. (Nutrition Journal, 13:9, 2014)

Beta-Alanine Reduces Muscle Lactate Buildup During HIIT

ALANINE IS AN AMINO ACID THAT PROVIDES ENERGY DURING EXERCISE AND PREVENTS NEUROMUSCULAR FATIGUE BY INCREASING TISSUE CARNOSINE LEVELS. Carnosine is an important antioxidant that protects cells from destruction and buffers acids that cause fatigue. Swiss scientists found that supplementing beta-alanine before a high-intensity interval training workout (HIIT) had no effect on blood buffering capacity or glycogen storage, but reduced muscle lactate by 23 percent. Taking beta-alanine supplements before HIIT might improve the quality of workouts. (European Journal Applied Physiology, published online Nov 9, 2013)



Nitrates Have Small Effects on Endurance Performance

NITRATES PROMOTE ENDURANCE PERFORMANCE SLIGHTLY — ACCORDING TO A LITERATURE REVIEW AND META-ANALYSIS BY RESEARCHERS FROM THE UNIVERSITY OF SYDNEY IN AUSTRALIA. The blood vessels use nitrates in food such as beetroot to produce nitric oxide — a critical chemical that promotes blood flow, improves sexual performance and enhances energy levels. The capacity of the endothelial cells (cells lining the blood vessels) to secrete nitric oxide is an important measure of cardiovascular health and performance. Healthy blood vessels secrete nitric oxide, which promotes blood flow to tissues throughout the body. Nitrites from food sources such as processed meats might increase the risk of cancer, so it's probably best to consume nitrates and nitrites from vegetable sources rather than from hot dogs or bologna. (International Journal of Sport Nutrition and Exercise Metabolism, 23, 522-532, 2013)



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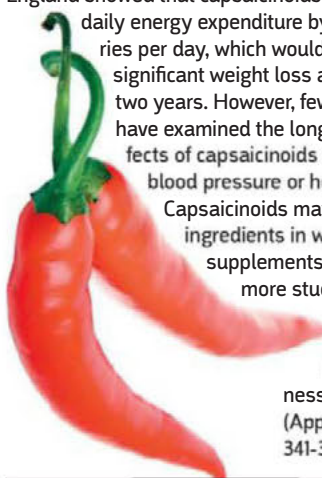
Creatine Promotes Multi-Workout Recovery

RESTORATION IS CRITICAL TO ANY EFFECTIVE TRAINING PROGRAM. SUCCESSFUL ATHLETES TRAIN HARD, RECOVER, AND TRAIN HARD AGAIN. Recovery rates differ between individuals. Slowly recovering athletes are prone to injury, overtraining and slow progress. Creatine monohydrate might help the restoration process. Kelle Veggi from the University of Iguazu in Brazil, and colleagues, found that creatine supplementation blunted muscle soreness and creatine kinase—a marker of muscle damage, which promoted recovery from repeated bouts of exercise. Creatine boosts strength, power and muscle mass. It also promotes restoration for more steady training progress. (International Journal of Sport Nutrition and Exercise Metabolism, 23: 378-387, 2013)



Capsaicinoids Promote Fat Loss

CAPSAICINOIDS ARE CHEMICALS FOUND IN RED CHILI PEPPER USED TO MAKE PAPRIKA, WHICH IS A SPICE USED IN CHILI AND MEXICAN FOOD. A review of literature by researchers from the Manchester Metropolitan University in England showed that capsaicinoids increased daily energy expenditure by 50 calories per day, which would produce significant weight loss after one or two years. However, few studies have examined the long-term effects of capsaicinoids on fat loss, blood pressure or heart rate.



Capsaicinoids may be useful ingredients in weight-loss supplements, but we need more studies to determine their long-term effectiveness and safety. (Appetite, 59: 341-348, 2012)

Caffeine Improves Performance Better During Morning Workouts

CONSUMING 200 TO 400 MILLIGRAMS OF CAFFEINE BEFORE TRAINING OR SPORTS COMPETITIONS IMPROVES PERFORMANCE IN ENDURANCE AND HIGH-INTENSITY EXERCISE. Caffeine is legal in Olympic sports but restricted in sports regulated by the National Collegiate Athletic Association (NCAA). Spanish researchers from the University of Castilla-La Mancha in Toledo found that caffeine improved performance in the bench press and squat when taken in the morning but not the afternoon. Caffeine is an important supplement for improving training intensity. It is more effective for morning than afternoon workouts. Consuming caffeine supplements in the afternoon was less effective and produced more side effects. (Journal of Science and Medicine Sport, published online April 26, 2014)

Green Tea Extract May Be Toxic to the Liver

GREEN TEA EXTRACT CONTAINS A CHEMICAL CALLED EPIGALLOCATECHIN-3-GALLATE (EGCG) THAT PROMOTES WEIGHT LOSS BY BOOSTING THERMOGENESIS (INCREASED CALORIE USE) AND CURBING APPETITE. Green tea extract is a popular weight-loss supplement, but it could be toxic to the liver. A study on rats from the University of Arkansas for Medical Sciences found that in animals with abnormal mitochondria (powerhouses of the cells), EGCG caused swelling in the mitochondria. The researchers suggested that green tea extract could cause liver problems in people with abnormal mitochondria. Obese people often have poor metabolic health, so they might experience side effects from green tea extract when trying to lose weight. (Biochemical and Biophysical Research Communications, 443: 1097-1104, 2014)





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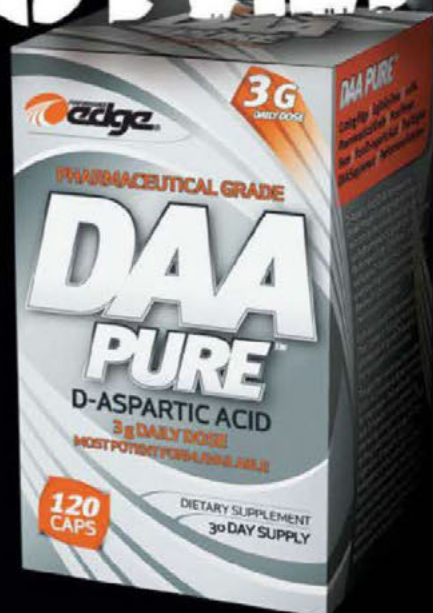
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Does Growth Hormone Therapy Cause Cancer?

GROWTH HORMONE IS A HIGHLY ANABOLIC HORMONE THAT BUILDS MUSCLE AND CUTS FAT.

It has been very popular with athletes because they could take the drug without fear of detection. Older adults have been the largest market for these drugs because of its effects on muscle, fat and skin. Italian researchers combined the results of existing research using a technique called meta-analysis. Death rates from all causes, cancer and cardiovascular disease were not increased but the incidence of cancers increased between 99 to 174 percent over non-users. This study raised a red flag regarding the long-term safety of growth hormone therapy. (Growth Hormone & IGF Research, published online April 13, 2014)

SARMs Could Be a Good Choice for Adult Hormone Therapy

SELECTIVE ANDROGEN RECEPTOR MODULATORS (SARMs) ARE SYNTHETIC ANABOLIC DRUGS MADE TO BIND WITH ANDROGEN RECEPTORS IN SPECIFIC TISSUES SUCH AS MUSCLE. Most anabolic steroids bind with androgen receptors throughout the body, which causes many of their side effects. While they bind with receptors in muscle, they also bind with receptors in other tissues that affect sperm quality, skin oiliness and blood pressure. SARMs that bind with androgen receptors in muscle have little or no effect in other tissues, so they produce fewer side effects. Testosterone therapy is extremely popular in middle-aged and older men. SARMs could provide the benefits of testosterone with fewer side effects. (Asian Journal of Andrology, published online December 16, 2013)

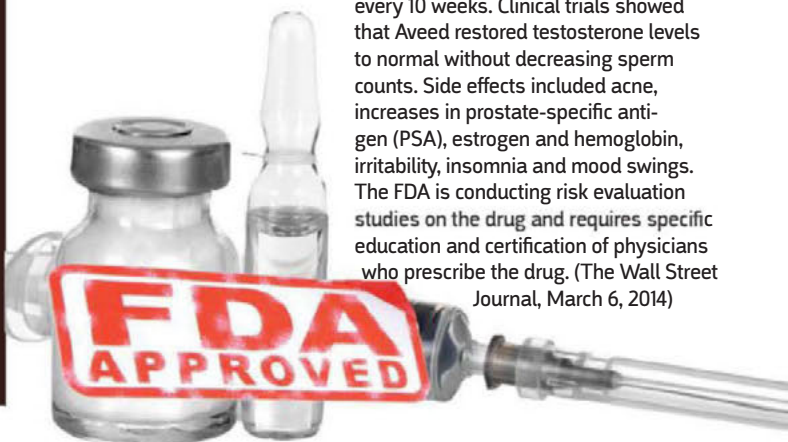


Tesamorelin Increases IGF-1 and Muscle Creatine Phosphate

TESAMORELIN (EGRIFTA) IS A SYNTHETIC FORM OF GROWTH HORMONE-RELEASING HORMONE, WHICH IS USED IN THE TREATMENT OF FAT CELL ABNORMALITIES IN PEOPLE WITH HIV. A study from Harvard Medical School found that 12 months of treatment with tesamorelin increased IGF-1 and muscle creatine phosphate in obese men with low growth hormone levels. IGF-1 is a powerful anabolic hormone that is the principal way that growth hormone increases muscle mass. Creatine phosphate is a high-energy fuel and is an indirect marker of the function of muscle cell mitochondria—the powerhouses of the cells. The effects on bodybuilders are unknown, but tesamorelin might be an effective performance-enhancing drug. It is prohibited by the World Anti-Doping Agency for use in Olympic sports. (Journal of Clinical Endocrinology Metabolism, 99: 338-343, 2014)

Long-Acting Testosterone Approved by the FDA

THE U.S. FOOD AND DRUG ADMINISTRATION (FDA) HAS APPROVED THE SALE OF AVEED (TESTOSTERONE UNDECANOATE) FOR MEN WITH LOW TESTOSTERONE LEVELS. Therapy involves an initial injection (750 milligrams), followed by another injection at four weeks, and then an injection every 10 weeks. Clinical trials showed that Aveed restored testosterone levels to normal without decreasing sperm counts. Side effects included acne, increases in prostate-specific antigen (PSA), estrogen and hemoglobin, irritability, insomnia and mood swings. The FDA is conducting risk evaluation studies on the drug and requires specific education and certification of physicians who prescribe the drug. (The Wall Street Journal, March 6, 2014)





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PREMATURE EJACULATORS HAVE Higher Free Testosterone Levels

PREMATURE EJACULATION (PE) IS THE MOST SIGNIFICANT SEXUAL PROBLEM IN MEN— MORE PREVALENT THAN ERECTILE DYSFUNCTION, LACK OF SEXUAL DESIRE, DELAYED OR INHIBITED ORGASM OR PHYSICAL ABNORMALITIES OF THE PENIS. Factors increasing the risk of premature ejaculation include past history of sexually transmitted diseases or urinary tract infections, poor health, emotional stress, loss of income, past history of same-sex activity, history of sexual harassment and childhood abuse. Factors decreasing the risk included daily alcohol consumption, circumcision and greater sexual experience. Men with strict religious backgrounds who view sex as a sin or those lacking attraction for their partner also have an increased risk of PE. An Iranian study found that men with premature ejaculation had higher levels of free testosterone and FSH (testosterone-controlling hormone). Testosterone has a strong influence on ejaculation. (Advances In Biomedical Research, 3: 6, 2014)



New Inhaled Insulin Product APPROVED BY FDA

THE U.S. FOOD AND DRUG ADMINISTRATION (FDA) APPROVED AN INHALED INSULIN PRODUCT CALLED AFREZZA DEVELOPED BY MANNKIND CORPORATION. The drug is the only mealtime insulin product approved by the FDA. Pfizer Inc., Nektar Therapeutics and Sanofi-Aventis S.A. developed an inhaled insulin product called Exubera. The drug effectively lowered blood sugar in type 1 diabetics who were previously taking low doses of injected insulin. The FDA approved the drug in 1996, but the companies removed the product from the market because of low demand and reports of an increased incidence of lung cancer in patients using it. MannKind is preparing a long-term study to assess the risk of lung cancer with Afrezza. (The Wall Street Journal, June 28, 2014)

Dehydration Increases Kidney Damage Risk from Metformin

METFORMIN IS A WIDELY USED DRUG TO TREAT TYPE 2 DIABETES AND IS POPULAR WITH BODYBUILDERS WHEN CUTTING FOR CONTESTS. Metformin works by preventing fatty acid accumulation, which reduces insulin resistance and improves blood sugar control. Bodybuilders take it during ketogenic diets to help reduce blood sugar and prevent fat accumulation. Athletes typically dehydrate during cutting to enhance muscle definition, but dehydration makes Metformin toxic to the kidneys. A study on rats by scientists from Shanghai Jiao Tong University School of Medicine in China showed that Metformin caused cell death in the kidneys when the animals were dehydrated. Metformin could cause serious kidney damage in dehydrated athletes. (Journal of Diabetes, 6: 132-146, 2014)

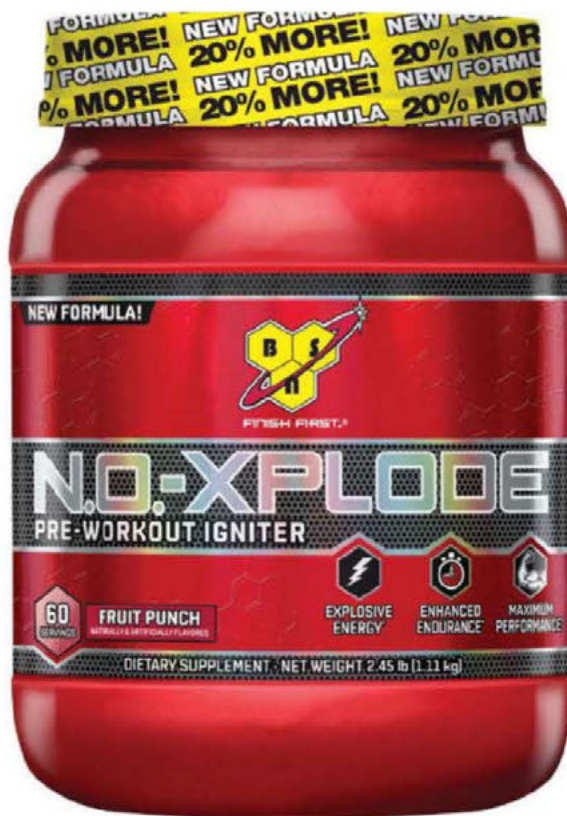
Painkillers Are Killing Americans

IN 2013, FORMER PRESIDENT CLINTON SPEARHEADED A CAMPAIGN TO REDUCE DEATHS FROM PRESCRIPTION MEDICATIONS SUCH AS OXYCONTIN, PERCOCET AND VICODIN. These drugs are lifesavers for people with chronic pain. However, they are used recreationally by many people, which has triggered widespread addiction and accidental death. Prescriptions for painkillers have increased 300 percent in the last 10 years, which has become a serious national health issue. Last year, 17,000 people died from prescription drug overdoses— an increase of 400 percent since 1999. Acetaminophen (Tylenol), a seemingly harmless drug, is the leading cause of drug-related admissions to emergency rooms. In high doses, acetaminophen is toxic to the liver. In most people, pain waxes and wanes, so use painkillers sparingly and only when you need them. (Consumer Reports, September 2014)



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Cell Phone Use Linked to Erectile Dysfunction

CELL PHONE USE COULD DAMAGE MALE REPRODUCTIVE HEALTH— ACCORDING TO A STUDY BY RESEARCHERS FROM THE UNIVERSITY OF GRAZ IN AUSTRIA. They found a link between the number of hours men carried active cell phones and the incidence of erectile dysfunction (ED). There was no link between cell phone talking time and ED or total testosterone. Other studies have found a link between cell phone use and reduced sperm quality and activity, and possibly cancer. Carry your cell phone in a bag instead of your pocket. (Central European Journal Urology, 66: 75-77, 2013)

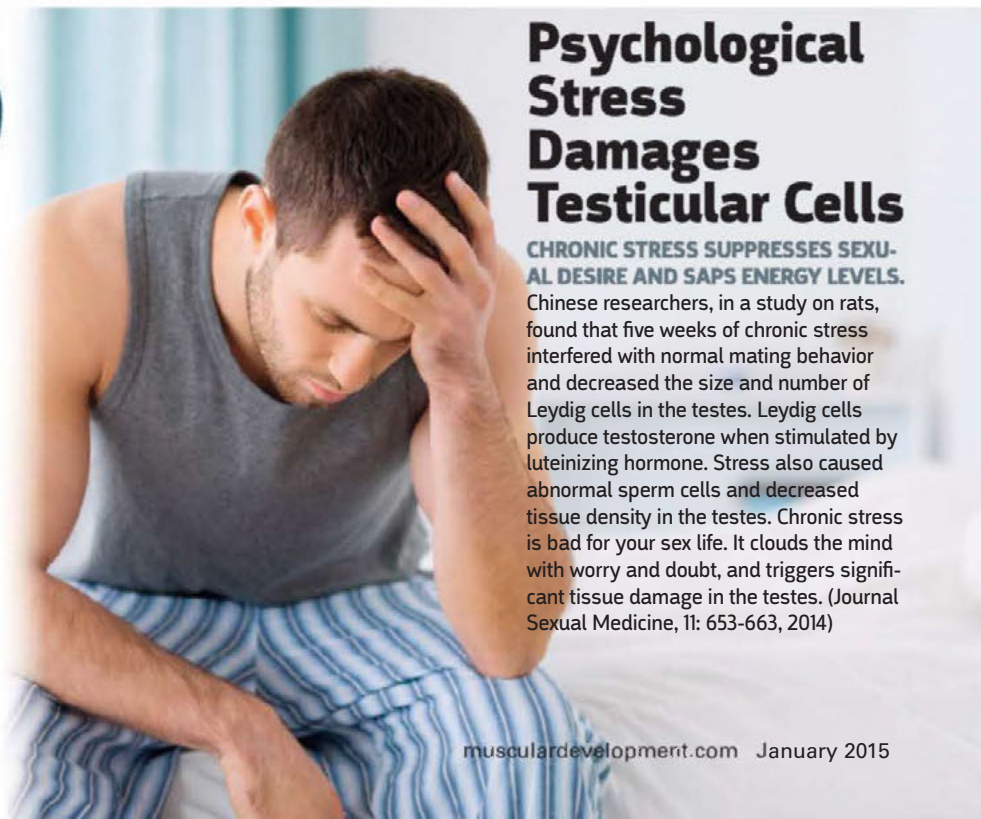
Viagra Increases the Risk of Melanoma

MELANOMA IS A DEADLY FORM OF SKIN CANCER THAT DEVELOPS IN THE MELANOCYTES— CELLS THAT GIVE COLOR TO THE SKIN. In 2014, about 76,100 people were diagnosed with melanoma and 9,710 people died from the disease. Nearly 1,000,000 people in the United States have melanoma. Previous severe sunburn and excessive use of tanning beds are leading risk factors of the disease. A Harvard Medical School study showed an 84 percent increased risk of melanoma in men who used of sildenafil (Viagra). In contrast, sildenafil was not related to the development of squamous cell cancer (a less dangerous type of skin cancer). (Journal American Medical Association Internal Medicine, 174: 964-970, 2014)



Viagra Increases Testosterone Levels

SHALENDER BHASIN AND COLLEAGUES FROM BOSTON UNIVERSITY FOUND THAT VIAGRA (SILDENAFIL) INCREASED TESTOSTERONE LEVELS BY 20 TO 30 PERCENT. Testosterone might be at the heart of erectile dysfunction. Viagra suppressed levels of the hormone LH, which showed that the drug influences the control mechanisms of testosterone metabolism. Viagra also caused increases in estrogen and DHEA. The researchers suggested that low testosterone output from the testes is centrally related to erection problems in men. (Journal Sexual Medicine, 11: 616-623, 2014)



Psychological Stress Damages Testicular Cells

CHRONIC STRESS SUPPRESSES SEXUAL DESIRE AND SAPS ENERGY LEVELS. Chinese researchers, in a study on rats, found that five weeks of chronic stress interfered with normal mating behavior and decreased the size and number of Leydig cells in the testes. Leydig cells produce testosterone when stimulated by luteinizing hormone. Stress also caused abnormal sperm cells and decreased tissue density in the testes. Chronic stress is bad for your sex life. It clouds the mind with worry and doubt, and triggers significant tissue damage in the testes. (Journal Sexual Medicine, 11: 653-663, 2014)

Statins Improve Erectile Dysfunction

ERECTILE DYSFUNCTION (ED) AFFECTS 30 MILLION AMERICANS AND 150 MILLION PEOPLE WORLDWIDE. ED is typically caused by abnormalities in the blood vessels supplying the penis. Drugs like Viagra and Cialis are the first line of defense for treating ED. The problem is closely related to coronary artery disease and is an early predictor of heart attack. Statins are drugs used to lower cholesterol and treat primary risk factors of coronary artery disease. A study by researchers from Capital Medical University in Beijing, China found that statins improved ED compared to a placebo. Statins may reduce blood vessel disease, which could have a positive effect on the erectile capacity of the penis. (Journal of Sexual Medicine, published online March 13, 2014)

The American Penis is in a Downward Spiral

MANY MEN WORRY ABOUT THE SIZE OF THEIR PENIS, AND MAYBE THEY SHOULD. A study from the Kinsey Institute for Research in Sex, Gender and Reproduction at the University of Indiana showed that penis size is smaller than in previous years. Ten years ago, a study by the Lifestyles Condom company showed that the average man's erect penis was 5.877 inches long, with two-thirds falling between 5.1 and 6.2 inches. About 17 percent of men measured less than 4.5 inches. The penis size reported in the Lifestyle study was shorter than that found in the famous Kinsey report more than 60 years ago. The new Kinsey study showed that the average length was 5.57 inches, which is shorter than the Lifestyle Condoms study and shorter than the Kinsey study from 60 years ago. Is the American penis in a downward spiral or are the differences due to measurement variations? You be the judge. (Journal Sexual Medicine, 11:93-101, 2014)



A Cialis a Day Keeps ED Away

CIALIS HAS BEEN CALLED "THE WEEKENDER" BECAUSE IT PROMOTES ERECTIONS FOR ABOUT 36 HOURS VERSUS SHORT-ACTING DRUGS SUCH AS VIAGRA. Many physicians are promoting daily use of Cialis (5 milligrams) to produce a more consistent erection

and greater sexual satisfaction. Korean scientists from Korea University College of Medicine found that daily or alternate-day treatment with five milligrams of Cialis triggered equal improvements in erection quality, sexual performance and sex frequency. Compliance is a consideration. Some people have difficulty remembering to take their medications when they follow an irregular schedule. (International Journal of Impotence Research, published online July 3, 2014)

The Penis Is the Window to the Heart

ERECTILE DYSFUNCTION IS AN EARLY WARNING SIGN OF CORONARY ARTERY DISEASE. Problems with the small blood vessels in the penis show up earlier than problems with the larger blood vessels in the heart. Chinese researchers found that young men who had difficulty maintaining erections during masturbation had a higher risk of coronary artery disease than men with normal erections. Previously, scientists speculated that erection problems during masturbation were linked to psychological disturbances. Erectile dysfunction during masturbation was linked to problems with the cells lining the arteries (endothelial cells), insulin resistance and other markers of blood sugar regulation problems. The penis is indeed a window to the heart. (Journal Sexual Medicine, 11: 1519-1526, 2014)



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SUGAR SUBSTITUTES LINKED TO OBESITY

People eat too much. Oops, the truth spilled out. There are far too many calories consumed by the general population, and laborious effort has been trimmed to the bare minimum in many people's lives. Compound that with the decline in active recreation (e.g., exercise, sports), and the cumulative effect over time is... where we are as a society now. There are nearly twice as many overweight and obese people as normal weight.

People are educated about calories, and want to reduce how much they take in. They still want to enjoy the flavor and experience of eating, just in a way that is consequence-free. Further, the interest and benefits of reducing carbohydrate intake—especially sugar—has allowed the sugar substitute industry to enjoy a healthy market demand. Sugar substitutes are also called non-caloric artificial sweeteners (NCAS), though certain ones do contain a caloric value. There is a long history of NCAS use, with the first commercial product having been discovered more than 100 years ago—saccharin. Currently, there are a handful approved for use in the U.S., more familiar by their brand names (e.g., Sweet'N Low, Splenda, Equal). Most NCAS are chemically synthesized, though plant-extract stevia products are now available.

The premise is logical—replace sugar and its simple carbohydrate calories with a substitute that provides the same taste (sweetness) but lacks calories. Genius! Nature OUTSMARTED... not. Recall, the golden years of sugar substitutes occurred DURING the obesity crisis that continues unabated today. Society as a whole did not enjoy weight loss, or even a prevention of further weight gain, with the availability of “non-caloric artificial sweeteners.” IT GOT WORSE. Individually though, did people who used artificially sweetened products lose weight?

Certainly, they must have since they were not consuming as much sugar or calories, right? Umm, maybe not... probably not... well, no, not really.

THE BODY'S RESPONSE

A 2007 review considered the use of NCAS and weight management.¹ The authors attempted to clarify one area of confusion—that being, do people who use NCAS make up the calories in later meals? Well, there is conflicting evidence, **but cutting to the chase, people don't** take in enough calories later on to make up for the calories they avoid from sugar by using NCAS. Not a whopping amount, as it results in maybe a half pound of weight loss per week based upon the calorie deficit. Of course, that assumes that the calories lost by substituting with NCAS actually make the diet hypocaloric. The review noted that NCAS consumers are generally people with a higher BMI, suggesting the calorie content of their

diet is above their maintenance needs.

So, with NCAS use, they are consuming fewer calories, but still too many. Perhaps gaining weight at a slower pace could be given an “honorable mention” award.

Researchers have rightly noted that NCAS are not just “sugar substitutes,” but chemicals that may have effects on various tissues, such as the intestines and brain.² One aspect questioned is the “enteral-brain axis” or gut-to-brain communication. When you taste something sweet, but don't get the increase in blood sugar and calorie availability, insulin release and suppression of fatty acid release that your brain expects from sugar—how does the body respond? It is confused, as sweet on the tongue should result in an influx of simple sugars that stimulate insulin release and begin to satisfy the appetite. Instead, it may lead to a greater demand for eating, as the body is told there is nutrition coming by the tongue,



but not seeing it as available calories. Though the data is sometimes conflicting, it also seems that the intense sweetness triggers the “reward” pathways in the brain, and in susceptible individuals this results in bigger meals or more frequent food-seeking behavior (e.g., snacking).^{2,3}

Bear in mind, the “five senses” — sight, smell, sound, touch and taste — are the brain’s direct connection with the environment. If the brain senses food by sight, taste or smell, it generates hunger and turns on behavior “programs” that result in eating. Fast food restaurants know this, which is why they have brilliantly lit marquee signs and pipe the smell of french fries into the exhaust vents to be inhaled by drivers passing by. The sweet taste of sugary icings is what drives most to eat doughnuts, not the cake. Now, imagine if you smelled french fries, and the aroma was coming from an auto parts

store. You don’t forget your hunger; you go looking for a nearby McDonald’s. If your brain tastes sugar, and it gets saccharin or aspartame, it sends you off to find food.⁴

The NCAS industry hasn’t been bothered by this, though, as people have a strong desire to consider themselves as iron-willed, capable of eating sugary snacks if they can indulge in a sweet, low-calorie treat instead. In fact, many people can utilize NCAS-sweetened beverages in

The golden years of sugar substitutes occurred DURING the obesity crisis that continues unabated today.



place of a sugar-sweetened soda or other high-calorie beverage.⁵ [NCAS work best in replacing the sugars in beverages, as they are not suitable for high-heat cooking, and the “empty” calories are present in beverages. “Sugar-free” foods often have similar calories due to the use of non-sugar thickeners to provide the “mouth-feel” expected from sugary foods.]

EFFECT ON METABOLISM AND GUT MICROBIOME

This would mean that NCAS are a valuable tool to losing weight, right? What do you think? New research (appearing after most NCAS have gone off-patent) suggests that NCAS might actually be sabotaging your metabolism. Our body is host to many bacterial colonies, so many that the number of bacteria cells actually outnumbers the “human” cells. The gut is a major locale, but as these bacteria come from nature, they work. In healthy, non-obese people, the bacteria help maintain the metabolism and health of the person, including ways that function like another endocrine organ. The gut “microbiome” has been shown to be altered by the diet, and the changes alter the human metabolism.⁶ But NCAS are not “food,” just sweeteners, so they should not affect the gut microbiome, right? Have you learned yet?

NCAS are not sugar, and their effects as chemicals have been sparingly researched (perhaps intentionally). However, now that research published in the eminent journal *Nature* has surfaced, it may be time to look at those little packets as more than pretty pink, blue and yellow sachets of sweetness.⁶

A series of experiments revealed some exciting (for scientists) findings. First, in mice given one of three NCAS for a week, compared to mice given water, there was a distinct and rapid onset of insulin resistance. This means they could not shuttle glucose (blood sugar) into their muscles and other tissues as well. The researchers suspected this was due to a change in the gut microbiome, so they treated the mice with antibiotics to kill all the gut bacteria, and the negative change was gone. Genetic analysis of the gut microbiome showed that the NCAS-fed mice developed an “unhealthy” population. Further, when the scientists transplanted feces (poop) from the NCAS-fed mice to a separate group of mice that were raised without a gut microbiome, the same changes occurred in the mice who received the fecal transplant — without being exposed to NCAS. This supports the idea that NCAS alter the gut microbiome in an unhealthy way, rather than affecting the organ function in the mouse.

Then, the researchers looked for evidence of the same effect in humans. Using data from an ongoing nutritional study revealed that NCAS users had a higher body mass index (BMI), waist-to-hip ratio, increased fasting glucose and HbA1c 9 (a marker

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THE FINAL WORD?

LOW-CARB VS. LOW-FAT

By Daniel Gwartney, M.D.

Again with the diets. Will it ever end? Is there a “best” diet? Well, there is new study that claims to have proven so, and a meta-analysis review stating there is no single best diet. And they wonder why people just want to take a pill?

Robert Atkins, M.D. was a cardiologist who championed a low-carbohydrate diet, but never received the professional respect he deserved. Through research and personal weight-loss efforts, he discovered the efficacy and potential health benefits of following a low-carbohydrate diet. Of course, this flew in the face of prominent cardiologists and dietitians who were touting a low-fat approach to weight management and cardiovascular health. The issue became ugly from a professional perspective. Certainly, the public was not well served, as obesity rates tripled during this time dominated by the low-fat advocates.

Isolating the argument solely to weight loss, several comparative trials have been published. As reported in a recent review, when collective results from numerous trials (48 trials involving more than 7,000 subjects) were analyzed, a diet is a diet when it comes to weight loss.¹ Again, they found that low-carbohydrate diets produced a slightly greater weight loss during the first six months. By 12 months, there was essentially no difference in weight loss between those assigned to low-carbohydrate or low-fat diets. This should come as no surprise, as it agrees with several previously published trials and reviews.^{2,3} Sadly, this has inspired some to re-state the simple equation that

weight loss simply follow fewer calories consumed than expended.⁴ In fairness, the author of that editorial does note that successful weight loss for the individual is entirely dependent upon adherence, and total calories consumed plays a major role, as well as the nutritional quality of the diet.

Compare that track record—no difference between low-carbohydrate and low-fat diets in regard to weight loss, to the conclusion of a recent 12-month clinical trial, “The low-carbohydrate diet was more effective for weight loss and cardiovascular risk factor reduction than the low-fat diet.”⁵ Well, who’s right? Certainly, the low-carbohydrate group in the latest study lost more weight than the low-fat group. The difference at the end of the 12-month trial was 3.5 kilograms (about eight pounds). However, that degree of difference was

achieved in the first three months, and no further benefit was noted throughout the remainder of the trial. Interestingly, by 12 months, both groups had reduced their waistline nearly the same amount.

Nonetheless, there was greater weight loss and the difference was maintained throughout the year. Is that the final answer? Well, the study did have some issues that make it difficult to apply to a general comment. Looking at the subjects—they were obese, mostly women, and the intervention involved dietary recommendations, a single daily meal replacement product, and periodic counseling. The “low-carbohydrate” diet certainly was designed to be fairly restrictive, allowing for only 40 grams of carbohydrates (excluding fiber); the “low-fat” diet recommended 55 percent of calories coming from carbohydrates, and less than 30 percent from fat. Yet, the recommendations were violated, resulting in the low-carbohydrate group consuming between 93 and 127 grams of carbohydrate daily (average with a wide variance), and the low-fat group only needed to decrease their fat intake by 5 percent of their calories to meet the goal. The “real life” experience really did not match the study design. Other issues are present, but space does not allow for a full discussion.

So, what is the final word in diet? Seriously, what works for you is what works for you. There are metabolic advantages and benefits to low-carbohydrate diets, and the restriction may not need to be as severe as suggested from the study results. If low-carbohydrate diets had the “favored” status that low-fat diets have held, the research would be challenging low-fat diets as having no weight loss benefit and lacking certain metabolic and cardiovascular benefits.

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of long-term glucose control, so higher is bad), as well as a gut microbiome that differed from those who do not consume NCAS. Of course, it is possible that those who are already obese are more likely to use NCAS as part of a weight-loss effort.

SABOTAGING WEIGHT-LOSS EFFORTS?

The authors tried to repeat a mini-study on humans, similar to that performed on the mice. Human subjects who did not consume NCAS routinely were given saccharin for a week, and tested before and after for signs of negative changes in how they handled sugar (aka glucose tolerance or insulin resistance), or changes in the gut microbiome. In four of the seven subjects, changes were noted. Finally, the researchers transplanted feces from subjects who showed changes, using stool samples from the day prior to receiving saccharin and after seven days of saccharin use. The pre-saccharin stool did not cause any negative changes in the mice, whereas the mice who received stool from the same human subjects after seven days of saccharin use developed signs of glucose intolerance. The pre- and post-saccharin feces had significant differences in the bacteria present, after just seven days.

While certainly not enough evidence for a conviction, it does suggest that NCAS may not be entirely benign as a food additive. NCAS may even be sabotaging weight-loss efforts in those who depend upon diet foods and beverages to a great degree. ■

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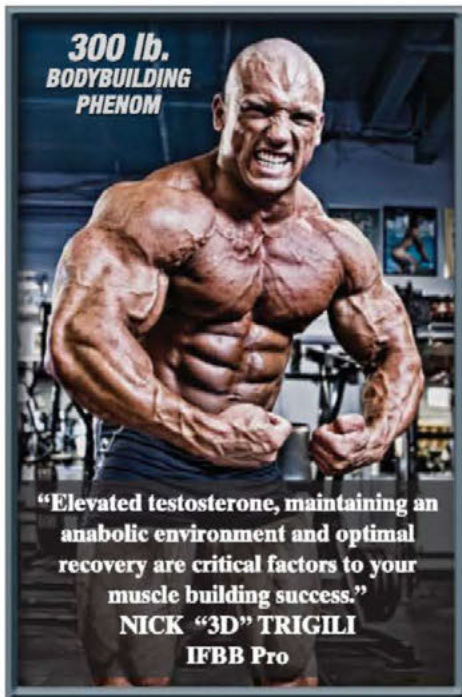
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We all know the importance of testosterone for muscle growth. But there is more to the muscle growth equation than testosterone. What's equally important for building muscle is maintaining an anabolic and anti-catabolic state. Clinically tested HICA, a leucine metabolite, has been shown to exert both anabolic and anti-catabolic activity and works on an entirely different pathway than testosterone.

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2014 THE YEAR IN REVIEW

Best Compounds for Lean Muscle Mass

Optimal nutrition is an essential element for optimal muscle growth. In fact, nutrition is arguably the most important part of a complete training regimen. This past year has seen some remarkable advances in nutrition performance. Here are a few of the more exceptional nutritional supplements covered in 2014 by Muscular Development. These supplements promote considerable muscle growth by either directly stimulating muscle protein synthesis, increasing anabolic hormone production and function, or by increasing energy levels within the muscle for improved exercise performance that drives the hypertrophic response and maximizes muscle mass.

Vitamin D: the Anabolic Prohormone!

Vitamin D is more than just the average vitamin promoting overall health and wellness. More recent evidence shows that vitamin D also functions as a powerful prohormone, driving muscle growth by increasing the activity of several key anabolic hormones that bestow a considerable hypertrophic response.

Vitamin D boosts testosterone production and function.

Vitamin D is a fat-soluble steroid-like molecule that directly regulates the expression of hundreds of genes¹, with several of the genes turned on by vitamin D evidently involved in the production of testosterone.² This effect was indirectly demonstrated in a study by Wehr et al.³, where they showed a strong correlation between vitamin D and testosterone levels. The group with the lowest vitamin D levels had the lowest testosterone measurements, and the group with the highest amount of vitamin D possessed the highest testosterone—indicating vitamin D increases testosterone production. Interestingly, the study Wehr et al. also found that higher levels of vitamin D produced lower amounts of the sex hormone-binding globulin (SHBG) protein. Since testosterone circulates in the bloodstream in an inactive form when bound to SHBG, vitamin D's ability to lower SHBG levels should also increase testosterone activity. Overall, this study illustrates that vitamin D not only increases the production of testosterone, but it also increases testosterone activity by diminishing SHBG's inhibitory influence on testosterone function.

Vitamin D potentiates the anabolic-insulin response to leucine. The muscle-building hormone insulin increases muscle growth⁴ by binding to the insulin receptor and setting off a cascade of signaling events that eventually activates the enzyme mTOR. The activation of mTOR triggers muscle protein synthesis, which drives muscle growth. One of the more effective activators of insulin-driven muscle growth is the muscle building, branched-chain amino acid (BCAA) leucine. Many studies have shown that leucine consumption activates the insulin-signaling pathway and muscle growth, especially when combined with resistance exercise.^{5,6} Interestingly, vitamin D deficiency has been frequently associated with insulin-signaling deficiencies, suggesting that vitamin D promotes insulin signaling and therefore, potentially, muscle growth. In order to understand the relationship between vitamin D and insulin signaling, Salles et al.⁷ looked at the influence that vitamin D had on leucine-activated insulin signaling in muscle cells. Since muscle protein synthesis is positively regulated by leucine consumption, the researchers wanted to see if vitamin D could enhance leucine activation of the insulin pathway. The results showed that vitamin D effectively enhanced leucine's ability to activate insulin signaling, while also increasing the rate of muscle protein synthesis.



Pump Up With Betaine

Betaine, also known as trimethylglycine, is a natural osmolyte found in the cell that protects the cell against dehydration by increasing cellular water retention through osmosis. The ability of betaine to maintain hydration reduces the negative impact that dehydration has on exercise performance such as increased heart rate, increased rate of glycogen degradation, elevated muscle temperature and increased lactate levels.

Furthermore, the ability of betaine to function as an osmolyte likely contributes to muscle hypertrophy by causing the muscle fiber to swell. Research has shown that muscle cell swelling stimulates protein synthesis and decreases protein breakdown, resulting in muscle growth.^{15,16} Although the underlying mechanisms are unclear, it has been suggested that cell swelling is perceived as a threat to cellular integrity—thereby triggering certain cellular signaling cascades to reinforce structural components of the muscle cell by promoting the synthesis of structural proteins within the cell, which ultimately increases muscle size.¹⁷

In addition to betaine's ability to counter dehydration and trigger muscle hypertrophy, betaine also plays a key role in the biosynthesis of the muscle-building compound creatine by donating a methyl group. In fact, it has been shown that betaine ingestion significantly increases anaerobic power in the bench press and squat.¹⁸ In conclusion, the diverse impact of betaine on these relatively diverse aspects of exercise performance reveals its tremendous promise as a nutritional supplement.

Buffer Your Muscles for Optimal Performance and Muscle Growth

Anaerobic glycolysis serves as the primary energy-producing pathway (ATP) within the muscle cell when weight training, resulting in the rapid accrual of lactic acid. Moreover, additional research has shown greater lactic acid amounts within muscle inhibit energy production while simultaneously reducing muscle force production.¹² Altogether, such changes severely compromise exercise capacity and recovery rates, ultimately weakening performance in the weight room and the ability to pack on muscle mass.

Fortunately, the body contains many different buffering systems that protect the muscle from a low pH environment caused by lactic acid buildup. The buffers that provide the greatest performance enhancement include bicarbonate and carnosine. While bicarbonate is the primary buffer outside of the muscle cell where it buffers blood pH, carnosine accounts for the large majority of muscle buffering within the cell.^{13,14} Consequently, supplementation of the diet with both of these naturally occurring buffers should safeguard against low pH levels in muscle tissue as well as the entire body, improving overall muscle performance for a more optimal workout.

“Creatine supplementation without caffeine (approximately 30 grams of creatine per day) for five days, followed by a relatively high dose of caffeine (approximately 600 milligrams) one hour before exercise, drastically improved muscular power output during high-intensity exercise.”

Caffeine Intake ONLY AFTER Creatine-Loading Phase Boosts Muscle Power

Although the simultaneous consumption of creatine with caffeine for extended periods of time negates the performance-enhancing influence of creatine on muscle strength, a more recent study by Lee et al.¹⁵ indicates that creatine supplementation without caffeine (approximately 30 grams of creatine per day) for five days, followed by a relatively high dose of caffeine (approximately 600 milligrams) one hour before exercise, drastically improved muscular power output during high-intensity exercise.

The results of the study by Lee et al. assert that the muscle-enhancing effects of creatine are not negatively influenced by acute caffeine ingestion, particularly when the ingestion of caffeine occurred after the creatine-loading phase. This is most likely because there was ample time for the muscle cell's creatine transporter to transfer plenty of creatine into the muscle cell during the loading phase without being inhibited by caffeine. Then, after the muscle cell is loaded with creatine—and converts a considerable amount of creatine into the high-energy molecule creatine phosphate for improved ATP production and muscular performance—the acute ingestion of caffeine right before exercise may trigger further creatine transport into the muscle cell while boosting additional energy production, sustaining even greater muscular performance.

Curcumin's Powerful Antioxidant Capacity Boosts Testosterone

Normal cellular function involves metabolic processes that generate oxidative stress on the cell. Research has found that increased oxidative stress, within the testosterone-producing Leydig cells in the testes, can lower testosterone production.⁸ In addition, it has been found that certain antioxidants, such as vitamin E, mitigate oxidative stress, which can slow down the age-related decline of testosterone production.⁹ These results suggest that consumption of more powerful antioxidants may decrease oxidative stress enough to actually increase testosterone levels.

In order to see if the above was possible, a group of scientists investigated whether consumption of the very potent antioxidant curcumin could increase testosterone.¹⁰ In this study, young male rats were divided into four groups and each group was given one of the following: gallic acid, which acts as a pro-oxidant and reduces testosterone; curcumin; curcumin plus gallic acid; or a placebo with no active ingredients. At the end of the study, the researchers found:

- The testosterone concentration of the gallic acid-

consuming group was roughly 30 percent lower than in the control group receiving the placebo.

- The gallic acid group also demonstrated considerable oxidative stress based on the significant drop seen in endogenous antioxidant molecules within the testis, because they were expended while scavenging molecules, causing oxidative stress.

- In the group ingesting curcumin, the testosterone concentration was 260 percent higher than in the control group, demonstrating that curcumin can enhance testosterone levels.

- The group ingesting gallic acid and curcumin also showed an increase in testosterone of 180 percent, establishing curcumin's capacity to overcome the oxidative stress induced by gallic acid and still increase testosterone production.

- Interestingly, both groups consuming curcumin showed less oxidative stress based on their normal levels of endogenous antioxidants.

The researchers from this study concluded that curcumin reduced oxidative stress within the testes, promoting better testicular function and resulting in enhanced testosterone production.

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THE BEST SUPPLEMENTS FOR BUILDING MUSCLE MASS

The “OFF”-season is in full force! With the holidays in the rearview mirror, it’s time to build as much muscle mass as possible. The contest-prep season is upon us, and your goals will soon shift from building muscle to maintaining muscle during cutting. Not that you can’t build muscle while cutting; I’ll leave this topic for my book, *The G.A.I.N. Plan*.

Although this article is intended to point out the best supplements for building mass, we can’t proceed without a little visit with Captain Obvious. Building muscle requires the right quantities of whole-food nutrition, eaten at regular intervals throughout the day. I will always recommend a minimum of a gram of protein per pound of bodyweight, plenty of complex carbohydrates, and healthy fats. The muscle growth machinery needs to be switched on every three hours with a meal or supplement. Adequate carbohydrate and fat calories will optimize the hormonal milieu with proper rest and recovery. Get your blood work, optimize your hormones, and train smart.

With all that being said, it is time to get to the topic at hand: supplements. When it comes to supplements for building muscle, we need to find combinations that work together. Why stack supplements that are counterproductive? Why take a fat burner when you are trying to gain weight? Why take two supplements that do the same thing?

We also need to use high-quality supplements that actually work! Even if you choose a supplement that has great science behind it, if you choose a brand of ill repute, you may end up with an underdosed or toxic supplement. Choose wisely and consider the following supplements to maximize muscle growth.

1. WHEY PROTEIN

Whey protein is the branched-chain amino acid-rich milk protein that is easily digested and rapidly absorbed. As we have discussed in previous columns, whey is particularly endowed with the amino acid leucine. Leucine is a very special branched-chain amino acid, thought to be the key that turns on muscle protein synthesis through the switch called mTOR. As you will soon learn, there are many ways to turn on mTOR, a critical step in building muscle.

Gram for gram, because of its high leucine concentration, whey is more adept at building

muscle than soy, casein or wheat protein. It is thought that most bodybuilders will optimize muscle protein synthesis with approximately three to four grams of leucine per meal. That would suggest that consuming 30 to 40 grams of whey protein will help build mass. Combining whey protein with an equal amount of carbohydrate in a post-workout meal turns on mTOR through leucine and a concomitant boost in insulin. “Whey is the way” to build muscle.

2. HMB

To build muscle, not only do you need to turn on muscle growth, but you also need to prevent muscle breakdown. Intense over-reaching training is intended to break muscle down, with the hopes that proper recovery will build more muscle than when you started. HMB, or beta-hydroxy-beta-methylbutyrate, is a metabolite of the amino acid leucine that is particularly good at preventing muscle breakdown. At three grams per day, I believe it should be a part of any intense training program.

HMB can stimulate muscle protein synthesis by up to 70 percent (leucine can up to 110%) while also decreasing muscle breakdown by up to 57 percent.¹ Recently, studies have suggested that HMB in its free acid form may be absorbed faster and may even be more effective than the calcium HMB form.² Further marketing-biased rhetoric has produced a more recent study in rats looking at the absorption kinetics and bioavailability of HMB free acid versus calcium HMB (sold by Abbott).³ The study from Abbott Nutrition Research and Development suggests that their product, calcium HMB, reaches higher plasma concentrations and is cleared slower than HMB free acid. Whether one is more effective than the other in building muscle will take a placebo-controlled, head-to-head study by unbiased researchers.

3. PHOSPHATIDIC ACID

Phosphatidic acid (PA) is a component of your cell membranes. Mechanical contraction of muscle is thought to stimulate enzymes that cleave PA from phosphatidylcholine in muscle cell membranes, increasing its levels in the cell. PA is then able to turn on mTOR through a domain that is separate from growth factors like IGF-1 or the amino acid leucine. Therefore, it has been suggested that PA may act synergistically

with leucine in boosting muscle growth.⁴

In a recent study on muscle cells in laboratory cultures, a soy-derived PA was incredibly powerful at activating mTOR.⁵ Follow-up studies on ingestion of 750 milligrams of PA per day versus a placebo with eight weeks of resistance exercise demonstrated significant improvements in the PA group.⁶ The subjects on PA gained more lean body mass, more muscle girth, and more strength. This is a supplement that needs to be studied in combination with whey protein and HMB.

4. CREATINE

Leucine, HMB and creatine are so powerful at building and maintaining muscle that a recent study explored their effects on muscle cells in culture.⁶ The scientists showed that these three compounds can prevent the actions of the muscle growth inhibitor that we all know very well: myostatin. Previous studies have also shown that creatine can reduce myostatin levels and even boost the conversion of testosterone to the more potent dihydrotestosterone (DHT).^{7,8} The elevation of DHT was almost 60 percent with the 25-gram-per-day loading phase at one week, and stayed 40 percent elevated for another seven days at a maintenance dose of five grams per day.

Creatine is clearly a strong performance-enhancing supplement, and is one of the most well researched of all sports nutrition products. There are many other versions of creatine, but creatine monohydrate (CM) appears to be the most consistent and effective. CM is most often loaded at five grams, four times per day for seven days, and then maintained at five grams per day. Contrary to broscience, one does not need to take a “creatine holiday” unless of course you get explosive bowel habits. In that case, your significant other may force you to take a break.

5. BETA-ALANINE

Intense training builds muscle. Therefore, there are a lot of supplements out there to help improve your ability to push muscle to new limits. Beta-alanine is a supplement that helps you to train harder in the gym, especially in combination with creatine.⁹ Beta-alanine supplementation is a more efficient way to build up muscle carnosine levels than by supplementing with carnosine itself. Carnosine buffers acid in

muscle, improving contractile force and limiting fatigue.

Moderate- to high-quality evidence suggests that beta-alanine supplementation increases total work done, power output, physical working capacity and fatigue threshold. Four moderate- to high-quality studies demonstrated an increase in lean mass in beta-alanine-treated groups compared to placebo groups.⁹ A recent dosing study published in the scientific journal of the American College of Sports Medicine suggested that ~1.2 grams of beta-alanine per day was optimal for maintaining up to 50 percent more muscle carnosine over baseline, after a six-week loading phase of 3.2 grams per day (four x 800 mg doses).¹⁰

6. CITRULLINE/ARGININE

Citrulline can be produced in the gastrointestinal tract from glutamine or from the release of nitric oxide (NO) from arginine. When citrulline is absorbed, it clears ammonium and lactate from the blood via conversion to arginine in the kidneys. In this way, citrulline actually augments arginine levels in the blood. Presumably, this augments your ability to produce NO. The malate in "citrulline malate" supplements is also an energy intermediate that may augment ATP energy production.

Studies have shown that citrulline malate can increase the amount of work performed during strength training, and mitigate delayed onset muscle soreness.¹¹ In a study of experienced weightlifters, eight grams of citrulline malate given 60 minutes prior to training led to significant improvement in the number of repetitions performed on the hack squat, leg press and leg extension to failure.¹¹ Citrulline malate at the same dose also improved upper body performance and recovery in another study.¹² Don't forget: your green leafy veggies and beetroots are your best sources of dietary nitrates for NO production!

7. MELATONIN

The next two supplements are actually hormones. Melatonin is a hormone secreted by the pineal gland in circadian rhythm to elicit sleep physiology. Supplementation with melatonin has the ability to improve deep sleep onset. It is during this deep sleep that your body undergoes reparative processes to recover from your training, in addition to releasing growth hormone.

Research has demonstrated that five milligrams of melatonin supplementation can improve growth hormone levels.¹³ In addition to many other antioxidant and metabolic effects, melatonin, when given in the evening, may be beneficial to the muscle-building bodybuilder. Don't neglect your sleep for optimal recovery from your training to build muscle.

8. VITAMIN D

Vitamin D is a hormone made from cholesterol, just as testosterone. Vitamin D also turns on a nuclear receptor just like the anabolic steroids. You must think of this "vitamin" as a vital hormone. Its function goes way beyond simply improving calcium absorption for healthy bones.

Multiple studies have shown how important vitamin D supplementation is for improving muscle strength, especially in vitamin D-deficient older individuals. Vitamin D levels in the blood have been correlated to muscle cell contractility, strength, and postural stability. Vitamin D deficiency has also been correlated to insulin resistance and metabolic dysfunction. Supplementation with vitamin D3 at 1,000 to 2,000 IUs per day may improve the actions of leucine and insulin in boosting muscle protein synthesis.¹⁴

9. ANABOLIC FATS

Despite the belief that fats are bad for

us, science is finally starting to accept the concept that fats are an essential macronutrient. Limiting fats in our diets for fear of heart disease has led to a vilification of any fat that is not from fish. The fact of the matter is that fats come in all shapes and sizes with different effects on our metabolism. Granted, trans fats, or hydrogenated vegetable oils, are quite metabolically toxic and should be avoided.

It has previously been suggested that arachidonic acid may be a pro-inflammatory omega-6 fatty acid that could be harmful to your health. In reality, arachidonic acid has important metabolic functions such as producing endogenous mediators of muscle growth. Arachidonic acid derivatives can turn on mTOR much the way that leucine does.¹⁵ Furthermore, the essential fatty acids, including omega-3 fish oils, are important mediators of repair and recovery from exercise. Don't believe the "low-fat" diet lie; consume plenty of healthy fats from dairy, fish and grass-fed meats.

10. CAFFEINE

Caffeine is the quintessential component of all pre-workout supplements. Many designer stimulants have come and gone, but caffeine is here to stay. A grande cup of Starbucks coffee is loaded with plenty of caffeine (330 mg) and antioxidants to boost your training in the gym. Studies suggest that caffeine limits perceived exertion, improves focus, and helps with muscle recovery.¹⁶

Remember, pick your supplements wisely. Stick to trusted brands and avoid vague labeling. More isn't always better. The supplements listed here are my favorites. There are many more out there with more or less conflicting studies. Stay tuned to this column and my blogs and social media feeds for further research updates @victorprisk on Twitter, Instagram and Facebook. ■

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DESIGNER DRUG UPDATE

The Perfect Anabolic



Pharmaceuticals (i.e., drugs) play an integral role in the fight against human disease. In order to fight this battle more effectively, drugs are typically designed to enhance their disease-fighting properties while minimizing any adverse side effects associated with their use. A classic drug-design example, germane to bodybuilders and athletes, is the creation of the synthetic testosterone derivative, the anabolic steroid, which was done to enhance the muscle-building, anabolic effects of these compounds while reducing their negative androgenic side effects, such as increased prostate growth and an increased risk for cardiovascular disease. Although the design of the synthetic anabolic steroid improved the anabolic to androgenic profile relative to testosterone, the production of a purely anabolic steroid has eluded all drug-design attempts thus far.

The inability to produce an exclusively anabolic steroid generated interest in another class of molecules known as selective androgen receptor modulators (SARMs), which appear to be very good candidates for creating exclusively anabolic compounds. In addition to selective modulators for the androgen receptor, the insulin and estrogen receptors have more recently been targeted for the design of selective receptor modulators that also possess a tremendous potential to exclusively activate muscle-anabolism, with little to no adverse side effects.

SARMs HAVE LOW ANDROGENIC PROPERTIES WITH THE POTENTIAL TO BE PURELY ANABOLIC

SARMs are a relatively new class of non-steroidal compounds that bind and activate the testosterone receptor in a considerably different manner than either testosterone or anabolic steroids. This different binding mode likely contributes to the unique capacity to preferentially trigger anabolism over androgenicity.

Although SARMs provide an opportunity for molecules that are purely anabolic, none so far only stimulate anabolic muscle growth

without producing some androgenic effects. However, more recent SARMs have been developed with relatively greater levels of anabolism and less androgenic properties. In fact, several SARMs have shown a ratio of anabolic to androgenic effects greater than 3:1 relative to testosterone with a ratio of 1:1.^{1,2}

Furthermore, a recent investigation by Dalton et al.³ illustrated, in a double-blind placebo study with 120 men as subjects, that ingesting the SARM called GTx-024 showed a dose-dependent improvement in total lean body mass and physical strength with no increase in prostate size. The researchers concluded that GTx-024 is an orally bioavailable SARM with tissue-selective anabolic and androgenic pharmacologic activity. However, although GTx-024 has low androgenic properties it also, along with most other SARMs, has been shown to be inadequately anabolic.

In addition to the study by Dalton et al., other investigations have looked at many candidate SARMs in preclinical and clinical trial studies^{4,5} and concluded that many different SARMs induce modest gains in lean body mass in healthy volunteers, but they are nowhere near the much greater gains in skeletal muscle mass reported with high-level dosing of anabolic steroids. The modest gains of 1.0 to 1.5 kilograms in fat-free mass with these SARMs over four to six weeks should be contrasted with the five- to seven-kilogram gains in fat-free mass with 300- and 600-milligram doses of testosterone enanthate. Nevertheless, because SARMs have become increasingly more anabolic over time, there is still hope that future generation SARMs will have greater potency, ultimately reaching the goal of being completely anabolic.

SELECTIVE INSULIN RECEPTOR MODULATORS (SIRMs) HAVE THE GREATEST ANABOLIC POTENTIAL

Insulin achieves its remarkable muscle-building effect by binding to the insulin receptor, which activates muscle cell protein synthesis and muscle growth.^{6,7} However, just as testosterone has desired anabolic properties along with unwanted side effects, insulin also has a desired anabolic impact on muscle tissue, along with several other effects throughout the body that could have an adverse impact your health. In fact, one of insulin's unwanted side effects is its ability to potentially cause the rapid uptake of too much glucose from the blood. Although glucose uptake could increase energy levels within the muscle cell, enhancing muscular performance and muscle growth, too much glucose uptake could dangerously lower blood sugar—causing hypoglycemia. What's more, insulin also stimulates cell division by activating another signaling pathway known as the mitogen-activating protein kinase (MAPK) pathway.⁸ Insulin activation of this pathway could cause excessive cell division, promoting the progression of certain types of cancers.

These potentially harmful side effects associated with insulin use, along with insulin's powerful anabolic capabilities, has driven a great deal of drug-design research into the controlled activation of the insulin receptor that would only activate the beneficial muscle-building actions of insulin without the adverse effects. Consequently, a unique class of drugs known as selective insulin receptor modulators (SIRMs) is being developed that will hopefully promote only muscle anabolism and not the aforementioned side effects.⁹

“THE DESIGN OF NEXT-GENERATION SELECTIVE RECEPTOR MODULATORS WILL LIKELY PROVIDE THE FIRST EXCLUSIVELY ANABOLIC COMPOUND. ONCE THIS EXTRAORDINARY COMPOUND IS CREATED, ONE CAN'T HELP BUT WONDER HOW MUCH OF AN IMPACT IT WILL HAVE ON BODYBUILDING AND SPORT.”

SIRMS SELECTIVELY ACTIVATE MUSCLE PROTEIN SYNTHESIS AND TOLERABLE GLUCOSE UPTAKE

In the search for compounds that selectively activate the desired response from insulin signaling, a recent study by Bhaskar et al.¹⁰ discovered an antibody molecule that has SIRM-like activity. While rapidly probing several thousand potential binding partners for the insulin receptor, the authors identified an antibody molecule they called XMetA. This newly discovered antibody tightly binds the insulin receptor but specifically activates protein synthesis and glucose uptake in the cell, although not as powerfully as insulin. More specifically, XMetA selectively triggers the AKT/mTOR pathway with a maximal effect that is 40 percent that of insulin but, in contrast to insulin, does not induce the MAPK pathway to drive cell division.

In a second study looking at potential SIRM candidates, Jensen et al.¹¹ explored thousands of potential small molecules for SIRM-like activity and discovered the synthetic insulin mimetic peptide S597 that selectively initiates a different signaling response relative to insulin. In this study, the researchers show that S597 activates the insulin receptor but not as strongly as insulin does. As a result of this lower insulin receptor activity by S597, only the AKT/mTOR signaling pathway is fully turned on, while the MAPK pathway is only partially stimulated.

SIRMS BOOST TESTOSTERONE AND MUSCLE GROWTH

Selective estrogen receptor modulators

(SERMs) are another group of selective receptor modulators that bind to the estrogen receptor, preventing interaction with its natural ligand estrogen. Unlike estrogen, which only activates the estrogen receptor, SERMs can either activate or inactivate the estrogen receptor in a tissue-dependent manner. In tissues where the SERM-estrogen receptor interaction inactivates the receptor, SERMs have an anti-estrogen influence. Originally, athletes and bodybuilders began using SERMs, such as Nolvadex or Clomid, for their anti-estrogenic ability to inactivate the estrogen receptor—particularly during and after a cycle of anabolic steroids, that may trigger abnormally high estrogen levels produced from the conversion of certain anabolic steroids into estrogen by a process known as aromatization. In order to mitigate the influence of too much estrogen, which can lead to unpleasant side effects such as gynecomastia, SERMs were used to prevent estrogen activation of the estrogen receptor. After many years using SERMs for their potent anti-estrogenic qualities, it became clear that SERMs, by way of their anti-estrogenic impact, not only inhibit the unwanted consequences of too much estrogen but also increase the amount of endogenous testosterone.

SIRMS INCREASE TESTOSTERONE PRODUCTION, BUT ONLY IN MEN

Exactly how the anti-estrogenic SERM effect increases testosterone levels was not well characterized until a group of scientists uncovered some of the biochemical details. In this study, Mazzarino et al.¹² investigated the impact of three different SERMs— Nolvadex,

Clomid and toremifene— on hormone and testosterone levels in four male and female subjects. All eight subjects were given two doses of one of the three previously mentioned SERMs, at 80 milligrams and 100 milligrams 24 hours apart, and their hormone levels were measured. In all four male subjects, testosterone levels increased significantly while all four female subjects showed no increase in testosterone production. Furthermore, the male subjects also showed an increase in luteinizing hormone (LH), which is a hormone produced in the anterior pituitary gland that stimulates the testicles to produce testosterone. More importantly, LH production is typically decreased by negative feedback when there is an ample amount of testosterone available. Because testosterone can be aromatized into estrogen, LH can also be inhibited by estrogen. Therefore, SERM interaction with the estrogen receptor in the brain prevents estrogen from binding, which removes the negative feedback from estrogen on LH production, thus stimulating an increase in testosterone production.

In conclusion, the design of next-generation selective receptor modulators for the testosterone, insulin and estrogen receptors will likely provide the first exclusively anabolic compound in the near future, despite the complex nature of the task. Once this extraordinary compound is created, one can't help but wonder how much of an impact it will have on bodybuilding and sport. While it will bolster the size and strength of the modern-day bodybuilder or athlete as never before, no drug, however well designed, can foster the necessary drive and passion to be a champion— no matter how perfectly anabolic that compound might be. ■

For most of Michael Rudolph's career he has been engrossed in the exercise world as either an athlete (he played college football at Hofstra University), personal trainer or as a Research Scientist (he earned a B.Sc. in Exercise Science at Hofstra University and a Ph.D. in Biochemistry and Molecular Biology from Stony Brook University). After earning his Ph.D., Michael investigated the molecular biology of exercise as a fellow at Harvard Medical School and Columbia University for over eight years. That research contributed seminally to understanding the function of the incredibly important cellular energy sensor AMPK— leading to numerous publications in peer-reviewed journals including the journal *Nature*. Michael is currently a scientist working at the New York Structural Biology Center doing contract work for the Department of Defense on a project involving national security.

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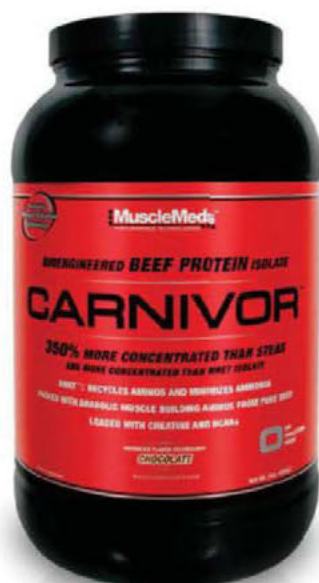
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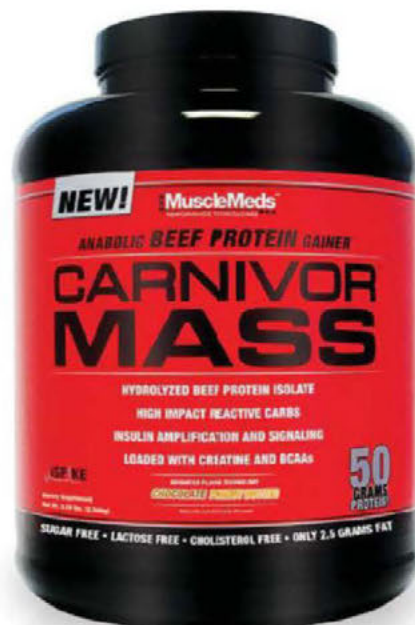
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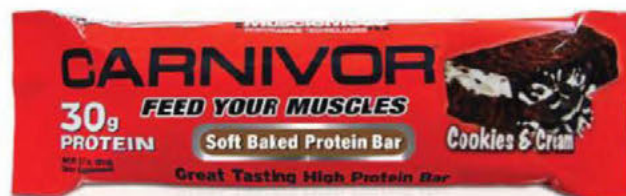


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WHAT IS THE IDEAL REP RANGE FOR BUILDING MUSCLE?

One of the age-old fitness questions is whether a powerlifting-type routine can build as much muscle as a bodybuilding-type routine. On the surface, it would seem that the bodybuilding routine has a clear advantage in this regard. After all, it's no secret that bodybuilders are generally bigger than powerlifters. If low reps and long rest intervals were the key to getting huge, then every bodybuilder would

be training like a powerlifter, right?

While this premise might seem logical, science tells us that logic doesn't always translate into practice. In order to accurately assess which type of training packs on the most mass, it's necessary to carry out controlled research where variables are strictly controlled. Only then can you draw a true cause-effect relationship on results.

Several previous studies have investigated this topic in a controlled fashion. Some did indeed show better results with bodybuilding-compared to powerlifting-type training^{3,8}, while others found no differences between the two.¹ ² A big limitation of these studies is that they were all carried out using untrained subjects. It's common knowledge that newbies respond to virtually any training stimulus; heck, even cardio produces hypertrophy in those who are sedentary! Consistent training causes alterations in anabolic intracellular signaling⁴ along with altered acute protein synthetic^{9,12,14} and transcriptional responses⁵ that indicate a blunting of hypertrophic adaptations. Thus, you can't necessarily extrapolate results from the aforementioned research to experienced trainees.

A recent study from my lab⁶ sought to provide clarity on the topic in well-trained men (4+ years average lifting experience). Subjects were randomly assigned to perform either 1) a powerlifting-type routine using low reps (2-4 per set) and long rest intervals (three minutes between sets), or 2) a typical bodybuilding-style workout with moderate reps (8-12 per set) and shorter rest intervals (90 seconds between sets). Total volume-load (reps x sets x load) was equated between groups to ensure that any differences would not be confounded by the amount of work performed. Thus, the powerlifting group performed seven sets per exercise while the bodybuilding group performed three sets. All sets were performed to the point of momentary concentric muscular failure. Training was carried three times a week for eight weeks.

The results might surprise you. While both groups significantly increased muscle mass, there were no differences noted between groups. In other words, both groups gained approximately the same amount of muscle over the course of the study, regardless of rep range! Interestingly, while both groups significantly increased their one-repetition maximum (1RM) in the squat and bench press, there was a slight edge to the powerlifting



"THE BEST APPROACH TO MAXIMIZING MUSCLE MASS IS TO TRAIN WITH A COMBINATION OF LOW AND MODERATE REPS."

group in terms of strength gains.

On the surface, these findings might lead you to conclude that, from a hypertrophy standpoint, it doesn't matter whether you train like a powerlifter or bodybuilder. After all, the study provides compelling evidence that as long as sufficient volume is performed, you'll achieve similar increases in size, regardless of rep range. And given that strength was greater in the powerlifting group, a case can be made that it's best to train like a powerlifter and get the best of both worlds, right?

Well, not so fast.

Here's the rub: Total training time in the powerlifting group was about 70 minutes, while that of the bodybuilding group was just 17 minutes. So from a time-efficiency standpoint, bodybuilding-type training produced similar hypertrophy (as well as nearly similar strength increases) in about a quarter of the time as the powerlifting routine.

What's more, exit interviews with participants in the powerlifting group indicated that they were fried by the end of the eight-week study. Virtually all said they had sore joints and complained of being mentally fatigued from the constant grind of performing heavy, low-rep sets; two



movement. A true hypertrophy routine needs to focus on specific muscles (and aspects of muscles) such as the middle and posterior delts, the hamstrings and the calves.⁸ The large time com-

“THE TYPICAL ‘BODYBUILDING REP RANGE’ SHOULD FORM THE BASIS OF A HYPERTROPHY-ORIENTED ROUTINE AS IT ALLOWS THE PERFORMANCE OF A GREATER AMOUNT OF VOLUME WITHOUT OVERTAXING THE NEUROMUSCULAR SYSTEM.”

of the subjects in the group dropped out from overuse injuries. Had the study gone on any longer, I'm certain these lifters would have become overtrained and ultimately seen a regression in results. On the other hand, those in the bodybuilding group reported feeling fresh. They were eager to get back in the gym, with many expressing a desire to increase training volume and frequency.

So here's the take-away message: While it appears that muscle growth can be similar with both heavy and moderately-heavy loads, provided that volume is equated, it just isn't practical to constantly train with high volumes and heavy loads over time. Understand that there is a clear dose-response relationship between volume and hypertrophy whereby higher training volumes correlate with greater muscle growth, at least up to a certain point.^{7,10,13} Because of the long rest periods and additional sets needed to equate volume in the powerlifting group, our study was only able to include three total exercises per session for a limited number of muscle groups (back, chest and thighs). That's simply not sufficient to maximize whole-body hypertrophy.

As every aspiring bodybuilder knows, achieving complete muscular development and symmetry requires working all the major muscle groups from different angles and planes of

movement associated with powerlifting-type training makes it virtually impossible to accomplish this goal in the context of a well-rounded routine. And even if you are one of the lucky guys who have all day to do nothing but work out, training exclusively with low reps still isn't a feasible strategy for maximizing hypertrophy. All that grinding on the joints and overtaxation of the neuromuscular system would ultimately wear you down. You'd rapidly end up overtrained, with nagging injuries and diminished performance. Not a good recipe for continued gains.

All things considered, the best approach to maximizing muscle mass is to train with a combination of low and moderate reps. The typical “bodybuilding rep range” should form the basis of a hypertrophy-oriented routine as it allows the performance of a greater amount of volume without overtaxing the neuromuscular system. That said, don't hold exclusively to such training. Adding in some heavy-load sets in the 1-5 RM range helps to maximize strength, which ultimately allows the use of heavier loads during moderate-rep lifting. And lifting heavier without compromising the number of reps increases mechanical tension in muscles—a primary driving force for muscle growth. The old-school bodybuilders like Arnold and Franco used this approach with great success. Seems like they had it right all along. ■

Brad Schoenfeld, Ph.D., CSCS, FNSCA is widely regarded as one of the leading authorities on training for muscle development and fat loss. He has published over 60 peer-reviewed studies on various exercise- and nutrition-related topics. He is also the author of the best-selling book, The M.A.X. Muscle Plan, and runs a popular website and blog at www.lookgreatnaked.com.

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MHP: T-BOMB 3 XTREME



TIME FOR A TEST RUN

With all the latest research, I just had to give T-BOMB 3xtreme a run to see if it lived up to the science. I ran the cycle for a full eight weeks to give it a proper review. First off, my strength did go up— not only on one-rep maxes but also on higher rep sets. My body composition was also tested, and after completing the cycle I gained six pounds of lean muscle while decreasing my body fat by 11 pounds. This occurred with no change to my caloric intake or changes to my training routine.

After using T-BOMB 3xtreme I noticed a major difference in the fullness and density of my physique, which is something that is not typical with most testosterone boosters. I think this is due to the many compounds in MHP's kick-ass formula that block and destroy estrogen. My sex drive was jamming like I was 15 years old all over again. T-BOMB 3xtreme will have you sporting more wood than a lumberyard. Don't say I didn't warn you!

All in all, I loved T-BOMB 3xtreme even more than the original and believe me, that is hard to do. So take it from me, if you are looking for a real deal testosterone booster, look no further ... this is the one!

T-BOMB 3xtreme

The Ultimate Anabolic Hormone Modulator

- Blasts free-floating testosterone levels through the roof
- Crushes estrogen conversion to a pulp
- Increases dense, hard muscle mass in no time at all
- Drives your strength and power to unknown limits
- WARNING ... off-the-chain sex drive
- The most sophisticated anabolic hormone modulator ever created

THE BEST JUST GOT BETTER!

Just when you thought that America's most popular testosterone-boosting masterpiece couldn't get any better ... it just did! That's right, MHP has recently launched T-BOMB 3xtreme— and if you thought the last formula was strong, get ready for the BOOM! T-BOMB II has helped thousands of bodybuilders and athletes optimize their testosterone levels like no other product before— and with MHP's latest release, it's only gotten bigger and badder.

HIGHER TESTOSTERONE LEVELS LEADS TO:

- Increased muscle mass and density
- Accelerated fat mobilization and lower body fat percentage
- Maximized protein synthesis
- Supercompensated muscle glycogen synthesis for better pumps
- Powerful sex drive and stallion-like performance

T-BOMB 3XTREME

Now, with a formula as good as the original T-BOMB II there really wasn't a lot of room to play with. The world's leading scientists and R&D team at MHP wanted to take this formula over the top, and that is exactly what they did. As hard as they tried to tweak the tried-and-true formulation, it was impossible. So they decided to make the best even better by making it 20 percent stronger.

To take things to the next level, MHP worked with the University of Tampa Human Performance Laboratory to conduct a study to prove just how powerful T-BOMB 3xtreme is. This study showed a 32 percent increase in free testosterone without any increase in estrogen in the test subjects. The exercise protocol was so intense that the people not using T-BOMB 3xtreme actually experienced decreased testosterone levels! This goes to show you just how powerful this new creation is.

5 REASONS WHY T-BOMB™ 3XTREME DESTROYS THE COMPETITION

1. INCREASES YOUR NATURAL TESTOSTERONE LEVELS

Clinical doses of proven testosterone-boosting compounds force your pituitary into overdrive! T-BOMB 3xtreme stimulates your pituitary to produce luteinizing hormone and triggers the release of testosterone, giving you explosive strength and head-turning gains in rock-hard muscle mass!

2. ELIMINATES TESTOSTERONE-TO-ESTROGEN CONVERSION

It's a sad fact, but not all testosterone remains once it's produced. The "aromatase" enzyme converts some of your testosterone into the primary female sex hormone estrogen, which is responsible for the accumulation of body fat, water retention, "bitch tits" and poor sexual performance. Anti-aromatase inhibitors found in T-BOMB 3xtreme eliminate the conversion of testosterone to estrogen.

3. CLOGS ESTROGEN RECEPTORS

Stage two of T-BOMB 3xtreme's "estrogen assault" uses estrogen-blocking compounds to clog the receptors, assuring that estrogen does not attach to the receptor and exert any of its estrogenic effects.

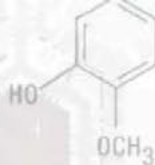
4. DESTROYS SHBG AND INCREASES "FREE TESTOSTERONE" BLOOD LEVELS

Elevated testosterone is only beneficial if it is circulating in the blood as "free testosterone." Sex hormone-binding globulin (SHBG) is a protein that binds to testosterone, rendering it useless. T-BOMB 3xtreme helps annihilate SHBG to free up even more testosterone for even greater gains in mass and strength. An animalistic sex drive is another positive "side effect" you will experience.

5. SHUTS DOWN THE CONVERSION OF TESTOSTERONE TO DHT

Testosterone can also convert into a hormone known as DHT, which is responsible for negative side effects such as baldness and acne. T-BOMB 3xtreme provides your body with the critical nutrients to minimize and block this conversion. Additionally, minimizing DHT, which normally competes with testosterone for the androgen receptor, leaves even more receptors open for testosterone to latch on to, making it that much more effective. ■

For more information, please visit mhpstrong.com.



NEW FAT BURNING BREAKTHROUGH TARGETS UCP-1

Kai Greene
KAI GREENE
2X ARNOLD CLASSIC CHAMP

PHENBUTEROL introduces a new development in advanced fat burning technology through the activation of Uncoupling Protein 1 (UCP-1), using the clinically tested ingredient Grains of Paradise (GOP). UCP-1 enhances fat burning in brown adipose tissue (BAT) by shuttling fatty acids from stored body fat into the mitochondria to generate heat and trigger thermogenesis. Utilizing fatty acids from stored body fat, rather than ATP from muscle tissue, is a unique fat burning mechanism of UCP-1 and brown adipose tissue – and one of the key fat burning actions and benefits of PHENBUTEROL.

To increase the fat torching power of PHENBUTEROL, MuscleMeds researchers selected a specific combination of active ingredients designed to maximize BAT thermogenesis for enhanced metabolic fat burning. In addition, select active ingredients in PHENBUTEROL also exert powerful energizing and mood enhancing effects to take the edge off dieting. PHENBUTEROL is a potent fat burning catalyst for serious athletes looking to lose excess body fat quickly and effectively.



- ▶ **Upregulates UCP-1 To Help Burn Stored Fat**
- ▶ **Activates Brown Adipose Tissue For Fatty Acid Utilization**
- ▶ **Promotes ATP Sparing Thermogenesis**

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BETANCOURT NUTRITION: THE BEEF STANDARD

PACKING ON THE BEEF

Anyone one who has been involved in this game for any amount of time knows the importance of consuming beef in relation to putting on muscle. In my opinion, when looking to pack on mass, beef is the go-to source of protein. Yes, chicken and fish are great, especially when dieting and getting ready for a contest. But very few would argue with me that there is a better meat source when it's time to pack on the beef (muscle, that is).

Betancourt Nutrition has been an innovative company, one that has produced high-quality products to meet the demands of hardworking bodybuilders all over the globe. They have recently released their newest protein formula known as "The Beef Standard" and it's creating quite a stir on message boards, setting them ablaze like a California wildfire.

WHERE'S THE BEEF?

Beef protein powders have been on the market for some time now, and they have recently become more and more popular. There are a few reasons for this. Why protein has been the top dog for over 20 years, and rightfully so. Its amazing amino acid spectrum and biological value score makes it a phenomenal source of protein.

Many bodybuilders and athletes are looking to avoid dairy products in all forms, and until now there have been very few choices to play with. Yes, we have egg white protein to look to, which was made popular in the 1980s. But for the majority, that train ride has come and gone, with few looking to jump back on for a return trip.

The reason that many bodybuilders and athletes look for an alternative source of protein is usually twofold. The amount of digestive issues plaguing bodybuilders, in my opinion, has never been higher. Whether it's a gluten and dairy issue, or another factor, many people are now steering away from consuming their three daily protein shakes all from a dairy source. With the paleo craze upon us, beef has become even more popular for protein supplementation.

THE TALE OF THE TAPE

Now, you may be wondering how does Betancourt's Beef Standard compare to consuming a real steak? I decided to do the breakdown for everyone to see. I am sure you will be pleasantly surprised at just how powerfully concentrated this formula is. Let's take a look.

STEAK

100 grams of steak = 25 grams of protein, 20 grams of fat, 87 milligrams of cholesterol, 0.1 grams of creatine.

VS.

THE BEEF STANDARD

1 scoop = 24 grams of protein, 0 grams of fat, 0 milligrams of cholesterol, 3 grams of creatine.

As you can see, one scoop of this amazing formula contains roughly the same amount of protein as 100 grams of steak. The upside is while that same piece of steak is loaded with a whopping 20 grams of fat, The Beef Standard leaves its mark with zero grams of fat, making it ideal— even for those who are dieting. Real steak is loaded with 87 milligrams of cholesterol while our beef protein supplement has zero milligrams. A major upside to this is the creatine content. Many bodybuilders love to consume beef, due to its high creatine levels. While the 100 grams of steak contains only 0.1 grams of creatine, The Beef Standard kicks some major ass with a mind-blowing three grams of creatine per scoop.

IT GETS EVEN BETTER

So as you can see, Betancourt Nutrition really did their homework on this one. But wait, there is more. One very important factor that should not be overlooked is that some companies use gelatin protein for their beef protein claim. There is absolutely no gelatin contained in The Beef Standard. Their formula is hydrolyzed, leading to superior quality to feed hungry muscles when they need it most.

Betancourt Nutrition used the trademarked BeefISO to ensure the quality and accountability of its protein source. It is manufactured in a US-DA-inspected facility, and is tested and packaged in Betancourt's 200,000-square-foot cGMP [Current Good Manufacturing Practices] facility.

Betancourt Nutrition has gone even one step further by adding their trademarked, muscle-building Super Serum to The Beef Standard. Super Serum is a bovine serum albumin concentrate protein that is rich in peptides and growth factors. It is a fast-absorbing agglomerated protein with a minimum of 10 percent IgG (immunoglobulin— a protein used by the immune system), 60 percent albumin and 5 percent transferrin.

BETANCOURT NUTRITION HAS DONE IT ONCE AGAIN!

So as you can see, Betancourt Nutrition has done it once again by releasing a new product that is gaining ground in the ever-growing protein supplementation market. The fact that they use the highest-quality ingredients with a name and reputation that has lived up to the hype has made me a believer.

I really liked the Cinnamon Swirl Beef Standard. I found it mixed easy, which is not always the case with beef protein. I remember many years ago when I first tried a beef source of protein, and it mixed up like mud. Then, on top of that, the bitter taste made me almost want to gag. The Beef Standard mixes up smooth and clean, with no aftertaste.

Something else that many people with digestive issues will find comforting is how easy it is on the stomach. I have dealt with different issues myself over the years, and I have to say I was very impressed. There was no bloating or discomfort, and the absorption was clean. Take it from me, if you are looking to try the newest, cutting-edge protein formulation, give The Beef Standard a go. I am sure you will be just as pleased as I was with this amazing, high-quality product.

For more information, please visit betancourtnutrition.com. ■

THE BEEF STANDARD

- Made with the highest quality beef available
- Helps build dense, lean muscle
- Contains no gelatin
- Contains Super Serum, rich in peptides and growth factors
- Tastes amazing with no grit or aftertaste
- Contains no fillers with absolutely no protein spiking
- Comes in three delicious flavors: Chocolate, Vanilla and Cinnamon Swirl



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BRANCH WARREN — THE — COME BACK KID

**THE TEXAS TITAN WAS WRITTEN OFF
AS HAVING HAD HIS BEST DAYS,
BUT NOBODY TOLD THE MAN HIMSELF**

Prologue: Branch Warren is renowned as a blue-collar bodybuilder in the Dorian Yates mold. Winner of the 1992 Teen Mr. America title, he turned pro by taking the heavyweight division at the 2001 NPC Nationals. The winner of seven pro contests (including the 2011 and 2012 Arnold Classics), his career high was finishing second to Jay Cutler at the 2009 Mr. Olympia. Lauded for his competitive spirit, he suffered a severe triceps injury in 2007 and an even more serious quad tear in 2011 (neither injury happened in the gym) and it seemed his career had peaked in 2012, as in 2013 he finished ninth at the Mr. Olympia and in March 2014 he placed sixth at the Arnold Classic. Thus in the countdown to last September's Olympia, many were of the opinion that his best days were behind him. Read on for this exclusive interview with Branch.

After winning the 2012 Arnold, your placings started to slip. Why was that happening?

I was disappointed with my condition at the 2013 Olympia—I actually deserved worse than ninth. I don't think the injuries were a factor. I was approaching 40 and doing the same things I had always done but not getting the same results, so I changed a few things and started working with George Farah. I was better at the 2014 Arnold [Branch placed sixth] but not as good as I wanted to be. So I made more changes, won the Europa in Dallas last May and qualified for the Olympia. But still knew I could be better, and I finally got it right for the Olympia when I finished sixth.

You said you didn't want to qualify for the Olympia via the points system [whereby points are awarded for good placings and a competitor can qualify for the Olympia without actually winning a contest], and that you had to win the Europa. Why?

To tell you the truth, I don't even know how the points system works. All I knew was that if you win a contest you're in the Olympia. The Olympia's supposed to be a contest of champions. I'm old school. I won two Arnolds and came within one place of winning the Olympia, so I figured if I couldn't win a qualifier, I would not do very well at the Olympia.

If you hadn't won the Europa, would you have entered another contest?

I don't know. I won the Europa, so the question didn't arise. Preparing for the Europa, I never thought of any option apart from winning it.

Even though you won the Europa, were you aware there was a feeling out there that maybe you had seen your best days?

I've been underestimated my whole career. When I turned pro, they said I'd



BY PETER MCGOUGH
PHOTOGRAPHY BY GREGORY JAMES

BODYSOLID



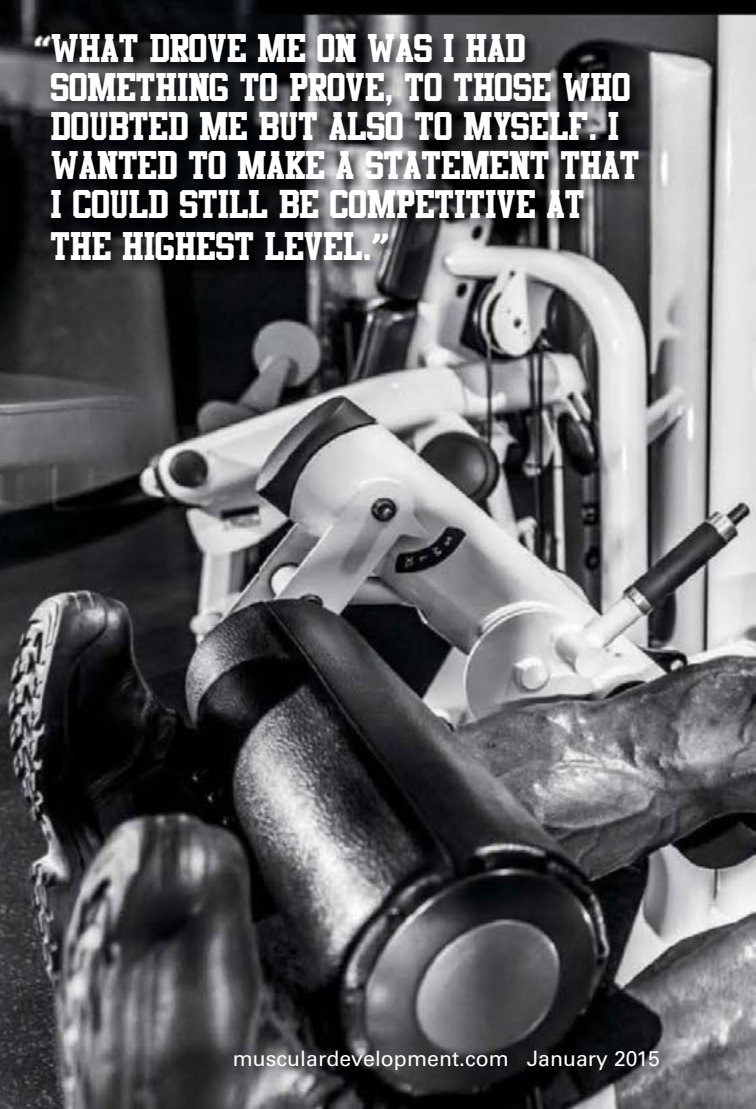
never win a show and I did. Then it was there's no way he'll ever win an Arnold, and I won two. Each time I got injured, they said he won't make it back and I did. I'm used to being written off so it didn't affect me. Let me ask you this, why does one man have the right to tell another man he can't do something? You can measure a man's height, weight, his strength, how big his biceps are. One thing the experts and critics can't measure is what's inside of a man, how strong is his will, how big is his heart, and how bad he wants something.

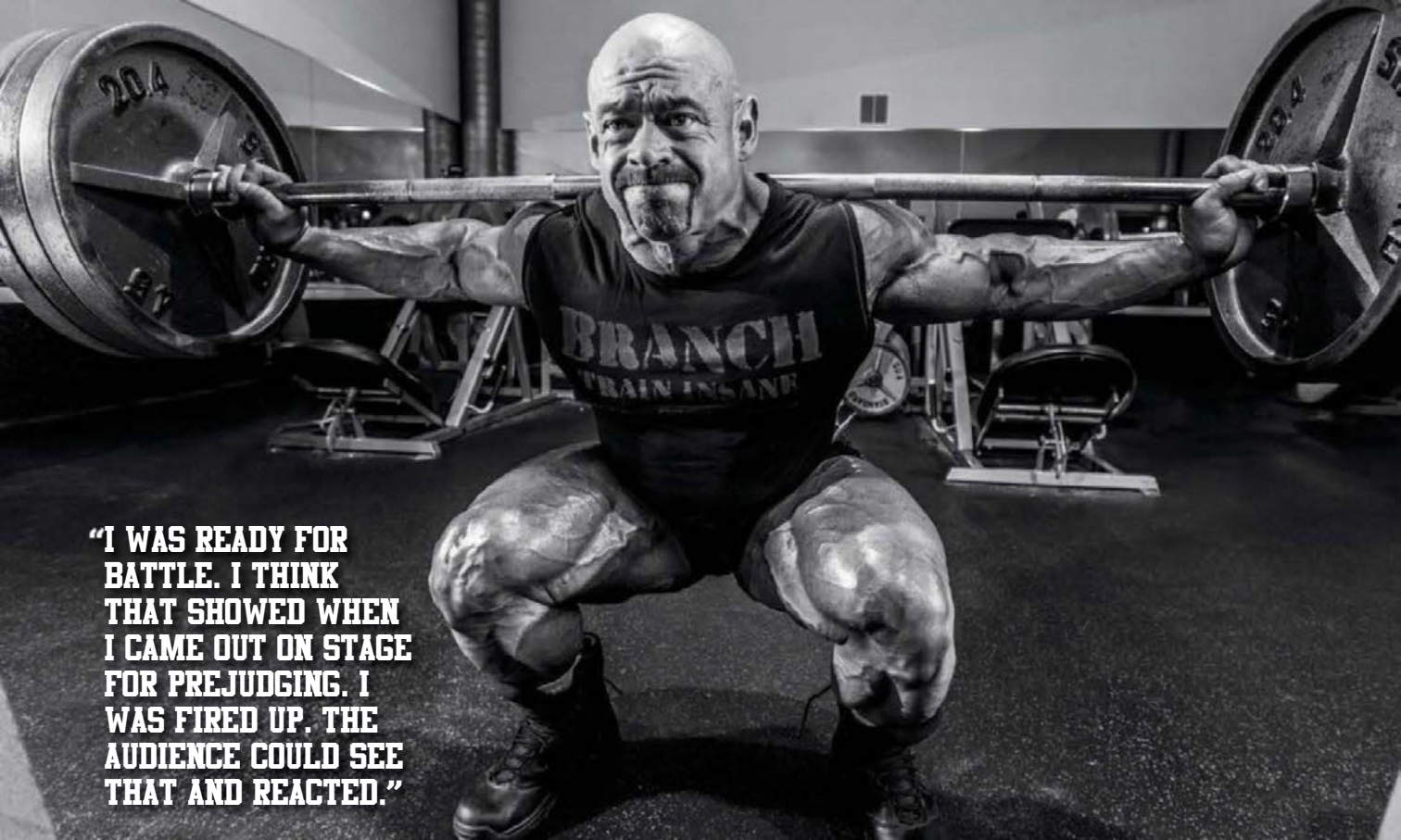
What was the biggest difference in getting ready for the 2013 Olympia where you were ninth, and getting ready for the 2014 event?

In 2013 I knew I wasn't going to do well—first time I ever felt that way. Going into the last week of the show, my wife Trish asked me, "So what do you think?" I said, "It ain't gonna be good." When I'm on, I know it. When I'm off, I know it. That feeling sucks.

This year, I felt differently. What drove me on was I had something to prove, to those who doubted me but also to myself. I wanted to make a statement that I could still be competitive at the highest level. In the days before the Olympia, I knew I was on, but knew where I finished was up to others. I only have control over me; I have no control over what the other guys may look like,

"WHAT DROVE ME ON WAS I HAD SOMETHING TO PROVE, TO THOSE WHO DOUBTED ME BUT ALSO TO MYSELF. I WANTED TO MAKE A STATEMENT THAT I COULD STILL BE COMPETITIVE AT THE HIGHEST LEVEL."





"I WAS READY FOR BATTLE. I THINK THAT SHOWED WHEN I CAME OUT ON STAGE FOR PREJUDGING. I WAS FIRED UP. THE AUDIENCE COULD SEE THAT AND REACTED."



no control over how the judges will see things. I do know this: every time I showed up in 100 percent shape, the judges rewarded me. Some people show up 10 percent short and they'll drop two places. If I'm 10 percent short, I'll fall five or six places, they say because of aesthetics and shape.

Two weeks out, I knew things were going well. I knew I'd be in top six. I'd done all my homework. I was about as good as I could have been— best I'd been in years. I was ready for battle. I think that showed when I came out onstage for prejudging. I was fired up. The audience could see that and reacted.

In your Olympia prep, what improvements were you concentrating on making?

The top priority was conditioning. I wanted to get my old conditioning back— like I had at the 2009 Olympia or 2011 Arnold. My goal was to equal or surpass that level of conditioning. The other thing was to get my legs back the way they used to be. I didn't want anybody saying, "Oh look, one leg is bigger than the other." I wanted my leg fullness to be back and for them to be balanced.

Looking back to when I tore my left quad in August 2011, I didn't take enough time off. I was back competing at the 2012 Arnold six months later. I should have taken longer, let it rehabilitate more before submitting to competition training. For most people, that injury would have ended their career— I was back in six months.

At the Olympia prejudging, what were your thoughts?

I didn't get called in the first five-man callout and I was pissed. I was included in the second callout and as it went on, I felt I was definitely in

the top six Afterwards, people—judges, fans, press—were telling me that was my best condition in years. I was satisfied with the package I brought. My overall feeling was, “I’m BACK.” I thought I may have finished higher and some people told me, but man, you’re sixth in the world. I said, “I don’t train to be sixth in the world at anything.” As for the other results: I thought Phil was the clear winner—not at his best—and I thought Kai was a solid second.

What’s next?

I’m going to use what I did this year as a platform to improve for the 2015 Arnold. I’d definitely like another Arnold trophy.

You’re pretty unique as a pro in that you have your own business outside of bodybuilding.

Trish and I got married nine years ago and soon after started our own freight business. We have people working for us, but not too many. It’s a full-time job. We could make the company bigger, but sometimes if you make something bigger it brings a lot more work but not a lot more profit.

I’m not a guy who can go to the gym for my workout and then sit around all

“GROWING UP, IF I WAS EVER TOLD I COULDN’T DO ANYTHING IT JUST DROVE ME ON TO DO IT. I LEARNED A LONG TIME AGO IT ISN’T THE MOST GIFTED RUNNER WHO WINS THE RACE, IT’S THE GUY THAT JUST WON’T QUIT.”

day. I have to be busy—Trish is the same way. In some ways it’s therapeutic. In 2013 I did my worst ever at the Olympia, and then followed up with a poor showing at the Arnold. If all I had in my life was bodybuilding it would have been a pretty stressful time, but having my company kept me occupied and stopped me thinking about bodybuilding all the time. My bills are paid by my company, so my income is not dependant on what I do onstage.

You and Trish have a young daughter. What difference has a child made to your life, your outlook?

Our daughter Faith turns 3 years old next February. Bodybuilding is a pretty self-centered sport and makes you kind of selfish. Having a child makes you feel responsible and think about someone else, not just yourself. Makes for a more well-rounded person, gives you a better life. We would like another child.

You have a huge fan base—talk about that.

I take a very responsible attitude toward the fans. For them, you become a role model and I take that very seriously. If you’re a top bodybuilder, you’re automatically a role model so act like one. I want to help inspire males and females out there who maybe feel discouraged when they’re told they don’t have the right genetics, mindset or whatever, to persevere. I heard all those things and I overcame all the negatives and achieved my goals. So I just like to be walking proof that you can do it if you’re willing to pay the price and work hard enough.

Some guys turn pro and just train, go home and watch SportsCenter or play Xbox. Then they’re not smart with their money and



buy cars and luxuries that are too expensive. They think their bodybuilding income is never going to end and when it does, they hit financial trouble. I grew up really poor and struggled. I do well because I bust my ass in the gym and in business. I never expected my bodybuilding career to last this long, so I always planned for life after I finished competing and made sure I had a good income. I tell a lot of young guys, you want to be a pro bodybuilder, that's awesome. But first get an education and start a business. You have to have something else lucrative in life besides being a bodybuilder, because you're only one injury away from your career being over.

I keep hearing stories about your hunting exploits. What do you hunt?

Where I grew up in rural East Texas, there was one of two things you did—you hunted or you drank beer. I didn't drink beer. The grown-ups were cowboys and all I wanted to do was ride bulls and hunt. We hunt wild boars, deer and elk. I've been hunting since I was 7 years old when I was taught how to shoot safely. In fact, I'm regularly featured in a program on cable TV called "The Hit List." It airs on the Outdoor Channel [Editor's note: check your local TV guide for listings.]

You're 40 next February—any thoughts on a time limit to your career?

I thought I'd be done and retired by the time I was 36. But 36 came and went and I was just hitting my stride. I've accomplished all my goals except for one—the Olympia. I've never done this for the money; I've been blessed to be successful outside of bodybuilding. Of my various contracts I've got two years left on them, so I'll be around for two more years. I was like the youngest guy on the circuit when I started, and I don't want to be the oldest guy.

So what drives you to keep competing, even though you are financially independent?

I just love to train and love to compete. I love the challenge of getting into shape and all that entails. I'm still healthy and still having fun. I proved by finishing sixth at the Olympia that I can still compete with the top guys and be a force to be reckoned with. Growing up, if I was ever told I couldn't do anything it just drove me on to do it. I learned a long time ago it isn't the most gifted runner who wins the race—it's the guy that just won't quit.



YOUR GUIDE TO *Monster* PECS

With IFBB Pro Akim Williams

WHERE HAVE ALL THE GREAT CHESTS GONE?

If you're familiar with either my training articles or my posts on the MD No Bull Forum, you know that one of my pet peeves is the lack of impressive pectoral development in today's pros and top amateurs relative to days gone by. It strikes me as beyond bizarre that today's best bodybuilders have backs and legs that put those of their predecessors to shame, yet the old-timers on average destroyed the current crop when we talk about chests. We have more than a few guys in the IFBB today whose physiques would look markedly more balanced and proportional if only they had thicker chests, and I won't even name names. Yet in the 1970s, when training equipment and nutrition knowledge was rudimentary by 2014 standards, I can't recall one— not one!— bodybuilding champion whose chest was anything less than thick slabs of dense beef. Arnold, Lou Ferrigno, Franco, Serge Nubret, Sergio Oliva, Mike Katz, Robby Robinson, Ken Waller, and on and on— those chests were no joke. And to give credit where credit is due, in more recent years we have also seen some excellent chests; Ronnie Branch, Johnnie Jackson and Victor Martinez are a few examples of pecs that have been built and stacked to the max. Now we have another pec king to pay tribute to in the form of rookie pro Akim Williams from New York City. His chest looks thick and dense from all angles— even in a front double biceps pose, when you could otherwise be distracted by his 23-inch guns! I spoke with this immigrant from the Caribbean island of Grenada to find out how he crafted those pecs that are as thick as bricks.



BY RON HARRIS
PHOTOGRAPHY BY GREGORY JAMES

CHEST HAD A HEAD START

When Akim first started weight training at 21 years old and 160 pounds (he hit 307 recently in the off-season), he didn't train back or legs at all. He didn't do shoulders or arms either. In fact, in the first few months, Williams only did what the rest of the guys in the weight room at the Brooklyn campus of Long Island University were doing, and that was bench press. He did it three or four times a week, and he got very strong in just a couple of months. "I remember there was a pretty big guy who worked out there, he was about 270 pounds," Akim says. "And everyone thought he was Hercules because he could do a few reps with 315, with a spotter helping him. They really freaked out when I was doing 315 for reps on my own, weighing over 100 pounds less than him." Thanks to the sole focus on it, Akim's chest was the first body part to develop. Eventually, he started training all the major muscle groups, but chest remains a strong point both literally and in terms of appearance.

AKIM'S TOP 4 TIPS FOR MONSTROUS PECS

1. USE A FULL RANGE OF MOTION

"I definitely believe in going heavy, but not if you are sacrificing range of motion. You need to get a good stretch in order to stretch the muscle fascia and allow more growth to happen, and you also need full contractions to get the best pump. You are better off doing a full range of motion with 300 pounds than you are getting half reps with 400 or more."

2. DON'T BE AFRAID TO HIT SOME LOWER REPS

"We are told to do 10-12 reps, eight at the lowest, to build the most muscle size. I can tell you that I have built most of my mass doing sets in the three to six rep range. You can and should

be incorporating some very heavy weights for maximum density and thickness. As long as you take your time warming up, stay focused on what you're doing and keep your form tight, you don't need to be scared."

3. START WITH INCLINES

"Anyone who's been training a while will tell you that the upper chest is much harder to build than the middle and lower regions. So if you wait until later on in the workout to work the upper chest with inclines, you're really putting yourself at a disadvantage. Start with incline presses while you're fresh and strong. Once I started doing that, my upper chest began looking fuller

and rounder within a month or two, and now it's so much more complete from top to bottom."

4. DON'T SETTLE FOR MEDIOCRE PECS!

"For whatever reason, not a lot of guys these days put the work in to build the best chest they can. As long as there is some development, they figure that's good enough. But having some thickness in a side chest pose isn't enough. Your goal should be to have a chest so thick that it doesn't flatten out to nothing when your hands are up overhead in a front double biceps or an abdominals and thigh pose. When your chest still looks thick in those, you know you've got some serious pecs."

INCLINE DUMBBELL PRESS

MD likes to keep it real, so I have to tell you that Akim rarely if ever presses with dumbbells. "I feel them more in my shoulders, but the bar lets me hit my chest perfectly," he notes. Many others have discovered the opposite to be true, which should point out the need for all of us to experiment with various types of equipment and use the tools that work best for us. It was thanks to MD that Akim started leading off his chest workouts with incline barbell presses a little over four years ago. "Two of the best chests in the sport belong to Branch Warren and Johnnie Jackson," he explains. "I read up on their chest training and also watched their training videos together on the MD site, and I noticed that they started with incline presses. Johnnie in particular is someone I always related to because he was so strong, and I liked to emphasize strength in my own workouts." That's an understatement.

True story: I was on the monthly MD conference call/editorial meeting to come up with the features for the next issue, and the possibility of this very feature came up as one to consider. I happened to have my Facebook news feed on the monitor in front of me, and Akim had posted a video just moments before from his chest workout that day: a set of barbell incline presses with 495 pounds for a triple. "Akim just put up 500 on the incline bar," I casually mentioned to Steve, Peter and the rest of the MD crew on the call. Nobody seemed too surprised.

"Start with incline presses while you're fresh and strong. Once I started doing that, my upper chest began looking fuller and rounder within a month or two, and now it's so much more complete from top to bottom."

SEATED BENCH PRESS MACHINE

Machines play a key role in Akim's chest training. The Hammer Strength decline press is one of his favorites, mainly because it provides an angle of pressing he won't do with a barbell anymore. "I used to do declines a lot, and I loved the pump I got from them," he says. "But one day I was pressing 405 and felt a weird pop in my shoulder. It scared me, and I've stayed away from barbell declines ever since." Often Williams will do several sets with the Hammer Strength decline press machine, then a few more on a seated bench press machine. "With these, I like to keep my rest periods between sets shorter, so my chest gets tighter and more pumped. There's no balancing required, so I can just concentrate on the feeling in my pecs."

CHEST ROUTINE

Incline Barbell Press	6 x 15, 12, 10, 10, 8, 6, 3
Flat Barbell Press	4-5 x 10-12
Hammer Strength Decline Press	4 x 10-12
Seated Bench Press Machine	4 x 10-12
Pec Fly Machine	4 x 15-20

TRAINING SPLIT

Monday:	Chest and triceps
Tuesday:	Back and biceps
Wednesday:	Legs
Thursday:	Chest (using chains) and triceps
Friday:	Back and biceps
Saturday:	Legs
Sunday:	OFF

"I like to keep my rest periods between sets shorter, so my chest gets tighter and more pumped. There's no balancing required, so I can just concentrate on the feeling in my pecs."

FLAT DUMBBELL PRESS

As you may have assumed, Akim doesn't do his flat presses with dumbbells, instead sticking with the same barbell flat press he has been doing since day one in the gym. For this exercise, he doesn't go quite as heavy, both out of safety considerations and sheer body mechanics. "I keep my reps around 10-12 on the flat bench, because I definitely don't ever want to tear a pec," he tells us. "And to be honest, I've never been quite as strong on a flat as I am on the incline." Akim sticks to 315-365 most of the time, and puts more focus into getting the best contractions and stretches possible. His best triple on the bench, for those keeping score at home, was 450 pounds.





THE CHAIN GANG

Akim trains every body part twice a week, reminiscent of the great Ronnie Coleman. One of his chest days will resemble the other in all ways, with one exception: chains. Akim was introduced to using chains in training by a man who had been a former NHL player and who also held the over-65 bench press record in the state of Florida. "I love how they give you constant tension, pulling down on the bar and giving you a totally different feel as you lower and press." Since the chains were at his university gym, Akim used to pack two 60-pound lengths, or 120 pounds of chain, into a gym bag and take it on the subway to use at Synergy Fitness in Manhattan. How's that for dedication? "I find them very valuable for increasing strength ... and for me, getting stronger has translated into larger, denser muscles."

CONTEST HISTORY

2010 Bill Grant Classic
2010 Brooklyn Grand Prix
2010 Eastern USA
2011 Junior Nationals
2011 IFBB North American
2012 Eastern USA

2012 USA Championships
2012 NPC Nationals
2013 IFBB North American

2014 New York Pro
2014 Chicago Wings of Strength

Novice Winner
Heavyweight Winner
Light Heavyweight Winner
Fourth, Heavyweight
11th, Heavyweight
Super Heavyweight
and Overall Champion
Fifth, Super Heavyweight
Ninth, Super Heavyweight
Super Heavyweight
and Overall Champion
11th Place
Fifth Place

FAST, EXPLOSIVE TRAINING FOR A MORE POWERFUL CHEST

BY ALAN GOLNICK

One of the fundamental rules of training is to keep your workout moving at a brisk pace, and not walk around the gym like you are in a coma. When it comes to chest training, there is more to making the best gains than stepping lively and "getting the lead out" while you're in the gym. Specialized training such as fast, eccentric exercise can increase muscle size and strength better than traditional bodybuilding workouts.

IT'S ALL ABOUT THE CONTRACTION

Fast, eccentric training is all about the contraction. The muscles of your body move in one of three ways—through static, concentric or eccentric contractions. While each should be incorporated into your training program for best results, high-speed eccentric contractions, or fast negatives, create more muscle tension than any other form of training. Lower the weight rapidly, stop suddenly and then slowly move the weight until the muscle is flexed.

Researchers from Harvard University concluded that muscle tension is the most important factor that affects increases in muscle size (hypertrophy). High muscle tension, particularly during the eccentric (lengthening) phase of the lift, causes small injuries to muscle fibers. The fibers get larger and stronger during the muscle repair process, provided that you give your muscles adequate rest and nutrition to heal and grow. Negatives or eccentric muscle contractions create more muscle tension than any other form of exercise. And fast eccentrics create more tension than slow eccentrics.

Just how important are fast negatives for muscle growth? The research is as robust and strong as Akim Williams' chest. Researchers from McMasters University in Canada found that high-speed eccentric training stimulated muscle hypertrophy and built strength better than slow eccentric training. Fast eccentric training accelerates hypertrophy because of the high muscle tension that is produced during the workout. And a review of seven studies by scientists from Brazil concluded that muscle damage and soreness is most associated with high-speed eccentric exercise.¹

THE POOP ON FIBER

Fast negatives will also help your body's fiber situation. Not the whole-

grain variety, but muscle fibers. Your body has two major types of muscle fibers, slow-twitch and fast-twitch. Larger, fast-twitch fibers contract about four times faster than slow-speed fibers. Because fast-twitch fibers have greater growth potential compared to slow-twitch fibers, fast-twitch fibers are optimal for muscle growth. High-speed training preferentially activates larger, fast-twitch muscle fibers. These fibers produce greater muscle force, and they are the preferred fiber type for greater strength gains. So more fast-twitch fibers equals greater gains in size and strength.

Fast, eccentric training can also do a "muscle fiber transformation" number on your body, giving you more muscle-inducing, fast-twitch fibers. Research has demonstrated that fast bench pressing can "shift" muscle fibers from slow- to fast-twitch.² In a study by Liu et al., test subjects were divided into two groups, with one group performing standard bench presses and another group performing both standard and accelerated bench presses. The researchers found that the group performing both standard and fast bench presses increased their fast-twitch fiber type by 15 percent, while decreasing the slow-twitch fiber by a similar amount.

TAKE YOUR TIME, BUT HURRY UP

Be careful with high-speed eccentric training because there is a greater potential for injury, especially if you progress too quickly. Start off with light weights, and don't use this technique more than once a week.

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2. Liu Y, Schlumberger A, et al. Different effects on human skeletal myosin heavy chain isoform expression: strength vs. combination training. J Appl Physiol



CABLE CROSSOVERS

To finish off his chest, Akim usually heads over to a pec flye machine. If he's close to a contest, he will opt instead for the cable crossover station. Either way, the goal is to torch the pecs with a searing lactic acid burn and fill them to bursting with blood. "The reps will be a lot higher than usual on those, like 15-20," he notes.



AKIM: BIGGER, BADDER AND MORE RIPPED IN 2015

Williams is aware that he didn't exactly set the bodybuilding world on fire when he placed just out of the top 10 at his pro debut right there in his hometown of New York City back in May. He had improved his back since turning pro at last year's IFBB North American, but he was still a diamond in the rough: massive yet lacking polish and detail. "What most people don't know is that I was working full time and going to school the whole time I prepped for that show," he discloses. "I didn't have the time I needed to bring my best." His schedule lightened up not long after that, which is why he did indeed sharpen up for the Chicago and Sacramento shows over the summer. Since then, Akim has been hard at work getting even bigger. His off-season weight before starting his diet for the New York Pro was 278-280, and he recently topped out at 307 pounds before tightening up a bit to guest pose at the Brooklyn Grand Prix. Keep in mind, only four years ago Akim was competing as a 197-pound light **heavyweight!** Still a young man at 29 and practically a baby in terms of bodybuilding experience, it will be interesting to see just what this gentle giant has in store for us in the coming years as a pro. In the meantime, try out some of his methods and ideas in your own chest training and see how thick and nasty your pecs can become!

Facebook: [IFBB Pro Akim Williams](#)

Instagram: [IFBBProAkimWilliams](#)



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10 BEST LIFTS FOR MASS

WITH DENNIS WOLF – 2014 ARNOLD CLASSIC
AND ARNOLD CLASSIC EUROPE CHAMP

BY RON HARRIS
PHOTOGRAPHY BY GREGORY JAMES

**THEY DON'T CALL HIM 'THE BIG
BAD WOLF' FOR NOTHING!**

At six foot and 270 pounds on contest day, Dennis Wolf is one of the most massive men to stand under the bright lights on a bodybuilding stage. As such, he knows a thing or two about building thick, massive muscle. And he's just the guy to demonstrate 10 great exercises you can use to get huge too! Dennis also shares his opinions and experiences to offer perspective on the impact these key movements have had in crafting his physique, which many now consider to be second only to four-time Mr. Olympia Phil Heath's. Whether or not you will ever get as big as The Big Bad Wolf remains to be seen, but rest assured that hard work on these 10 movements will take you ever closer to your maximum potential size.





"I DON'T CARE ABOUT HOW HEAVY THE WEIGHT IS. I ONLY CARE ABOUT MAKING THE MUSCLE GROW. I COULD PUT 500 POUNDS ON THE BAR AND BOUNCE IT UP AND DOWN, BUT THAT WOULD BE STUPID."

BARBELL BENCH PRESS

We lead off with a lift that has achieved iconic status over the past 70-odd years not only among bodybuilders, but to anyone who has ever trained with weights—be they kids in their basement, football players in the team's weight room, or guys hoping to get bigger and stronger in gyms all over the world. It's been the measuring stick for strength to untold legions who seek to hoist more weight in the bench press than their peers, and need to ask, "How much ya bench?" just to make sure it's not more than they can.

But far more importantly for our purposes, the barbell bench press is a superior compound movement for building bigger pecs. "This is the big daddy of chest exercises," Dennis says. "It allows you to use the greatest loads and work the most amount of muscle. Do the reps slowly and squeeze the chest, or else you will get stronger but your chest probably won't grow much."

For the first 12 years he trained, Wolf would bench press at nearly every chest workout. In more recent years, he has switched to more dumbbells and machines, yet still keeps the bench press in his rotation. "I bench press once a month now, and even then I don't like to go very heavy." Of course, four good sets of 10-12 reps with 315 would be considered very heavy by plenty of guys, but it's not a tendon-straining amount of iron for The Big Bad Wolf, and that's the whole point. "I like to do the reps in very good form, with a solid squeeze of the pecs at the top of each rep and a good stretch as I lower the bar slowly."

Even though Dennis doesn't bench press with the barbell as often anymore, he still recommends that beginners pay their dues on it. "It's the absolute best exercise to build a foundation with. Just be sure you use it the right way to build muscle, not just worrying about how much weight you use and doing just a couple of reps."





HAMMER STRENGTH BENCH PRESS

What on earth is a machine doing on this list? It's true that basic free-weight movements are the staples of accruing greater muscle mass. Yet you can't deny that some modern machines are also incredibly effective. Both six-time Mr. Olympia Dorian Yates, and 212 division legend and former world 202 champion David Henry, used their fair share of machines to pack on thick, dense muscle, particularly when it came to chest and back training. Yet still a certain stigma seems to be attached to using tools such as the machines produced by Hammer Strength, especially within the hardcore bodybuilding community.

Machines were something that Dennis also once looked down on somewhat when it came to pressing, until he started thinking more for himself and stopped worrying about what others did and advocated. "The Hammer Strength incline press machine has been very valuable for me because it targets my upper chest perfectly," he tells us. "If I avoided it because people say machines are no good, I wouldn't have been able to get the extra thickness up there that I have now."

Dennis likes this machine so much that even if he started his workout with incline dumbbells, he will usually make his way to the incline Hammer piece later on also. That's not to say he doesn't make use of other Hammer Strength chest machines too. "Sometimes if I feel my outer or lower pecs need to be a little thicker and fuller, I use the wide or the decline press machines."

From my own experience, all of the Hammer pieces for chest pressing are excellent choices. They all feature independent movement arms, which means that just as with dumbbells, it's impossible for a stronger side to dominate. The movement arms travel inward toward the midline of the body as you press, allowing for intense, complete contractions of the pecs. Since you don't need to balance a bar, you can focus entirely on the feeling in the muscle. Ideally, you should do a barbell or a dumbbell press first while you're fresh, and then move on to a Hammer Strength machine afterward.



BARBELL ROWS

You know how we often ask a pro, "What's the absolute most effective exercise for this or that body part?" Dennis didn't hesitate in naming the barbell row as the one exercise that has given his back the most mass. "Haney, Dorian and Ronnie all had incredible backs, and they all did a lot of heavy barbell rows. That's not a coincidence. It's very close behind the deadlift for being the top choice for building a thicker back, and for me it's actually contributed the most."

Though he doesn't use the underhand grip that Dorian made famous, you'll notice that he does pull the bar to a very low point on his torso, lower than his navel. "My upper back has good size now, so I focus everything I can on the middle and lower lats to get those areas thicker."

Wolf is a stickler for strict form on his rows, and won't normally use any more than 365 pounds. For a man who hovers around 300 pounds most of the year, that's really not so heavy. "I don't care about how heavy the weight is," Dennis

states. "I only care about making the muscle grow, and I need to have good contractions and feeling in the lats for that. I could put 500 pounds on the bar and bounce it up and down, but that would be stupid."

Reread those last few sentences and let it sink in, because your technique on barbell rows is what will ultimately determine whether they effectively target your lats, or instead hardly stimulate them. I feel obliged to mention that the great Lee Haney felt so strongly about using excellent form on his barbell rows that he typically used just 225 pounds most of the time, and never had more than 275 on the bar throughout his entire Mr. Olympia reign.

One last point I need to make is that you need to be conscious not to stand up too much and turn your rows into a half-assed shrug, cutting the range of motion far short and losing the angle of horizontal pulling needed to properly engage the lats. In other words, you are far better off maintaining roughly a 70-degree angle and using less weight than you are nearly standing upright with twice as much on the bar.



T-BAR ROWS

Dennis does some type of free-weight row at every workout, as they are essential for developing greater back thickness. He admits that T-bar rows are done only about every third workout, while barbell rows are more of a mainstay. Wolf also likes T-bar rows, though he considers them more of a partial movement due to the width of 45-pound plates interfering with a full contraction.

"In both the barbell and the T-bar row, you always need to be careful not to stand up too much and start making it like the top part of a deadlift," he advises. To that end, he doesn't ever go as heavy as he could if he didn't care about a full range of motion and quality contractions. "I lifted heavy weights with my back for years and didn't see much improvement," he tells us. "Once I stopped worrying about using a ton of weight and made the feeling in the muscle the most important thing, my back finally started getting better again."

Dennis' observation about using 45-pound plates is important to note, as their size does prevent a full range

of motion. You simply can't pull your elbows back as far because the plates hit your chest or abs, depending on where you are pulling to. One solution is to use 25-pound plates instead. The only problem with that, for someone as strong as Wolf, is that there isn't enough room on the typical T-bar row to fit enough plates needed to supply adequate resistance. Most gyms no longer have actual, dedicated T-bar rows on a platform with various grip options. Therefore, most of us have to jerry-rig the "corner" T-bar row that Ronnie Coleman made famous, jamming one end of an Olympic bar into a corner and slipping a close-grip cable row attachment under the other end. For every problem, there is always a solution.

If in fact you are so strong that seven or eight 25-pound plates, or "quarters" as many of us refer to them as, is too light when doing T-bar rows, do them at the very end of your back workout when various chins, pulldowns, rows and deadlifts have fatigued you already. Make the most out of the exercise by pausing to fully squeeze your lats to the max at the top of every rep.

BARBELL MILITARY PRESS

"People ask me what exercise I think has helped me build my shoulders the most, and this is the one," Dennis says. "It felt right to me from the start, and my shoulders have always responded to it very well. I know some bodybuilders like dumbbells or machines, but this is my favorite shoulder press."

Wolf started doing the military press within a month or two of when he started weight training, though he had been using a machine version from the start. "But then I noticed the big guys were always doing the barbell presses," he remarks.

For a time in more recent years, Dennis switched over to the Smith machine, until eventually making a connection between worsening shoulder pain and that device, thanks to a phenomenon to be cautious of called "pattern overload." That means that since you always move exactly in the same movement pattern on a Smith, you are at risk of overuse-type injuries if you use it exclusively over the free-weight version of any exercise.

"This is the bread-and-butter movement for shoulder mass. You can press with a barbell or dumbbell



DEADLIFTS

Many have argued that the deadlift is the absolute most important exercise for anyone seeking to bulk up their body, since it comes closer than any other of deserving the term “full-body movement.” Think about it. The drive off the ground involves the entire lower body: quads, hams, glutes and even calves. As the bar passes the knees, all the pulling muscles of the upper body come into play: the lats, traps, spinal erectors, rear delts and biceps. Even the forearms get worked, holding on to the heavy weight! When it comes to bodybuilding, we are all aware of how key back development has become. “Shows are won from the back,” is a mantra that rings true more often than not. Haney, Yates and Coleman won a total of 22 Mr. Olympia contests partly by dominating their rivals in all the back poses.

Dennis didn't move past the level he had been stuck at for years in the two biggest shows, the Olympia and the Arnold, until his own back took on a thicker look. “You will probably never get a very thick back unless you do deadlifts— this is the bottom line,” Wolf says. “I don't think you have to use 800 pounds like Ronnie, but you do have to try and go as heavy as you can for 8-10 reps.” That's also the strategy Dorian employed, doing deads at the end of his back workouts when mega-heavy weights weren't possible anyway.

We often hear that deadlifts are responsible for bulking up a lot of waists and making many thousands of guys look “blocky.” Dennis agrees, to

or even a machine, but you have to work hard on overhead presses,” Wolf adds. “They involve the entire shoulder plus the triceps, so you can handle a lot of weight once you get strong.”

Due to their value, he also feels it makes sense to do your presses first on shoulder day. “You really should do it when you are fresh and have all your energy and concentration,” he notes. It's also beneficial to commence with presses when you are using a barbell or dumbbells because we all tend to lose our coordination and ability to balance and keep weights “in the groove” as we fatigue.

Some like Juan Morel and Evan Centopani have professed their preference for standing presses, but Dennis does all his shoulder pressing seated, as it keeps the torso stable and allows him to go heavier in safety. “I don't use a weight belt for these, so I need to be sure my back is not arching too much. You see some guys leaning back so far, they are doing inclines

for the chest when they are supposed to be making their shoulders grow!”

A final bit of advice Dennis offers is to always take the time to warm up thoroughly before even thinking about doing heavy presses. “I always do at least two sets of 20 reps, then usually a third set for about 15 reps, gradually getting closer to my working weight,” he says. “I have

never had a shoulder injury, and I don't want one. I can't afford to lose any more training time like I did from the hernia— I still have many improvements I need to make.”

Just in case you're wondering how much Dennis and his cannonball delts have managed to press overhead, he has done good reps with 405 in the past. But since safety and longevity are major concerns these days, he sticks with a working weight of 315 to 365.




an extent anyway, that they can be a bad choice for some. “I think if you are built for power more so than for having an aesthetic type of physique, you will end up with a thick core,” he says.

Dennis has done more than his share of heavy squats and deadlifts over the years, yet his waist has remained small. “I would advise against avoiding deadlifts out of fear they will give you a blocky waist,” he tells us. “They are an excellent exercise for back thickness, and as far as making your midsection grow, that's either going to happen eventually no matter what, or it isn't.”

Dennis does add that training for pure power and using very low reps is something to be cautious of. “Any time you are trying to develop maximum strength in the squat or deadlift, like a powerlifter would, you are going to force all your core muscles as well as your glutes to work just as hard or harder than your legs or back. That's OK for a powerlifter because it's all about squatting or deadlifting as much weight as you can. But I don't think bodybuilders should do any less than eight reps on those lifts.”

Rack or half deadlifts are another option to consider, as starting the lift from the knees or just under takes the lower body out of the movement and makes it more of a pure back exercise. Most find that they can overload their backs with far greater resistance in this partial movement, and see excellent improvements in their back thickness as a result.



“PEOPLE ASK ME WHAT EXERCISE I THINK HAS HELPED ME BUILD MY SHOULDERS THE MOST, AND THIS IS THE ONE.”



SQUATS

The barbell squat has earned its reputation as the king of all lower-body movements, thanks to results experienced by many millions of men and women over many decades. "Squats are the very best exercise for legs," Dennis echoes. "They hit your quads, and also your hams and glutes. I just feel better if I do them. If I don't squat at a leg workout, I feel like something was missing or I slacked. If you look at all the guys with the best legs like Ronnie, Branch, Kai and Jay, they all did a lot of squats."

After warming up, Dennis begins his quad workout (done on its own day apart from hams and glutes) with squats, as he feels it makes sense to start with the most productive movement when he's fresh. He does not believe in the conventional practice of warming up with leg extensions. "These only warm up the quads and maybe the knees, but you are using so many other things for squats like your glutes and hams and even the lower back—to me, it just makes more sense to warm up for squats with light sets of squats."

Another consideration is that many do leg extensions first so squats will target more quads and less glutes and hams. "I need all the glute and hamstring mass I can get," Wolf quips. "For other guys I guess it's different."

Dennis is more than capable of doing 8-10 reps of squats with 495 and has even done reps with 585, but in recent years he's been experimenting with higher-rep sets with success. "A lot of times what I will do is use only 315 or 405 at the most, for four work sets of 12 reps," he says. "But I keep the rest periods between the sets short so the weight feels heavier with each set, even though it's the same. By the last set, I am getting the most ridiculous pump and burn in my quads—but it's so much safer for my knees and my lower back."

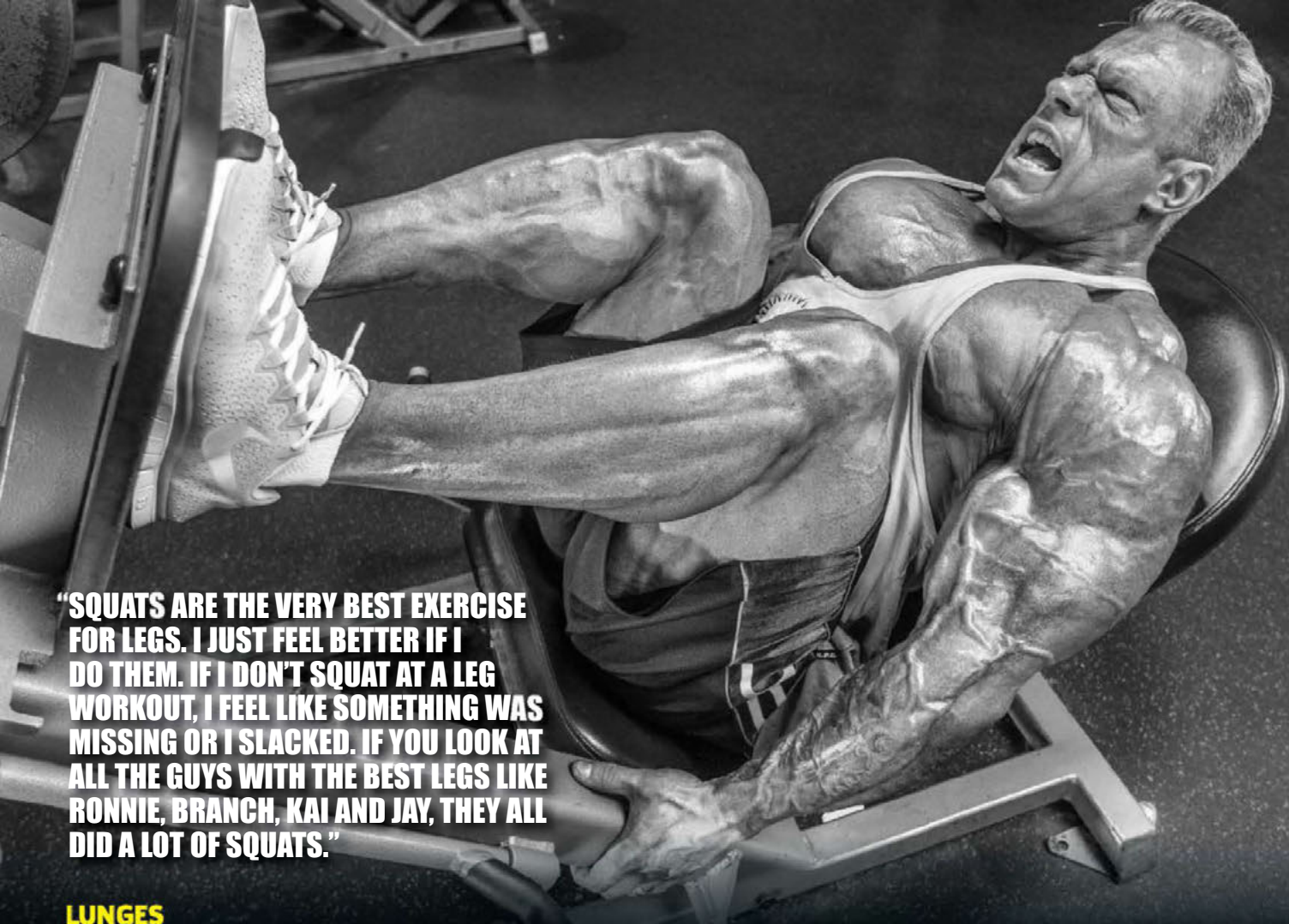
The above switch also made Dennis much more consistent with barbell squats. For several years, he would alternate them with Smith machine squats from workout to workout, mainly as he worried that heavy barbell squatting

all the time would eventually lead to another injury (he hurt his knee badly while squatting in 2002), and as a pro bodybuilder who earns all his money based on his physique, that's something he can't afford. But now that he's discovered a way to get the most out of squats without always having to put a ton of weight on his back, Dennis squats at pretty much every leg session.

When Dennis squats, he goes down just past the point where he breaks parallel and no further, as he doesn't see any benefit to burying the weight in the hole, or "ass to heels" as some call it. "If you have that type of structure and flexibility, going to rock-bottom can be perfect for you," he says. "But most taller guys don't, and for us hitting parallel is the best way. Usually you will know because one way just feels right to you and the other doesn't."

As for the Smith machine, Dennis now only uses it for squats if he feels he needs a little extra pump in his quads, and likes to set his feet forward. "That's something you obviously can't do with a barbell, and it works just the quads."





"SQUATS ARE THE VERY BEST EXERCISE FOR LEGS. I JUST FEEL BETTER IF I DO THEM. IF I DON'T SQUAT AT A LEG WORKOUT, I FEEL LIKE SOMETHING WAS MISSING OR I SLACKED. IF YOU LOOK AT ALL THE GUYS WITH THE BEST LEGS LIKE RONNIE, BRANCH, KAI AND JAY, THEY ALL DID A LOT OF SQUATS."

LUNGES

It's very safe to say that until fairly recently in the history of bodybuilding, lunges were strictly considered a shaping/cutting movement at best, and certainly something you saw mostly women and very few men ever doing in the gym. Everything changed in 2001 with the release of the DVD "Ronnie Coleman – The Unbelievable!" In it, Ronnie wrapped up a leg day while training for the 2000 Mr. Olympia contest out in the baking Texas sun with "parking lot lunges." On the giant's back was a 315-pound barbell as he took stride after stride, his quads billowing like enormous zeppelins, with garden-hose size veins straining against the fabric of his tights. This was no dainty "shaping movement" reserved only for girls!

Done with sufficient resistance, lunges will add serious size to the quads, glutes and hams. Wolf himself prefers to rely more on squats and leg presses, and adds lunges to his routine only when he is preparing for a contest, but he recognizes their value as a productive compound movement nonetheless. Whether to do them in place or walking is a matter of preference, but Dennis feels walking is the way to go. "It's a lot easier to get the set done when I can see the point on the gym floor I need to reach," he notes.

LEG PRESS

When Dennis started training way back in 1998, he had no idea how to do squats properly, and in fact had yet to realize they were in any way essential to building the best legs possible. So for the first two or three months, the leg press and extensions were all he did for quads. For the many years he wasn't always squatting, Smith machine squats or the leg press would be his heavy compound movement. Wolf still does them, but now more as a complement to squats rather than a replacement. That's how most of you seeking to build massive legs should think about them, too.

"It just makes sense to me to do squats first because for those you have to keep the bar balanced and also your lower

back needs to assist," he tells us. "But once you have done a few tough sets of squats, the leg press lets you sit down and just push with the thighs without having to keep anything balanced, and your lower back is fully supported."

Wolf also recommends using different types of leg presses if you have access to them. "Not every gym has a lot of different equipment, I know, but if you can use a vertical leg press you should give it a try. The old-school guys like Arnold and Franco did those all the time, and I like them a lot."

Regardless of what type of leg press you use, Dennis insists that you will always be better off being more concerned with the feeling in your quads, hams and glutes rather than

seeing how many plates you can load up. "Get a full range of motion and feel the muscles working," he stresses. "Any gym you go to, you will see guys who put every plate the machine holds on and then doing these little half-reps—and nine times out of 10, their legs aren't very developed at all. Forget about the weight. I can't even tell you how many plates I use because I just don't care. I guess it might seem like a lot to some people, but I could use a lot more if I didn't care about doing the movement correctly and feeling my legs doing the work."

Dennis will often use both the standard angled leg press shown here as well as the vertical leg press in the same workout, as they offer completely different feels.

SHRUGS

To round out the list of 10 exercises that will pack meat on your frame, we come to shrugs. The trapezius muscle, or traps, gives a look of rugged power when maximally developed, bulging upward from the collarbones like sloping mountain peaks. Weak traps can detract from an otherwise amazing physique, as we have seen in the case of Kai Greene. The traps do receive significant amounts of indirect stimulation from most shoulder and back exercises. But to maximize their development, direct work with shrugs is critical. “You can use dumbbells, a barbell or even a machine, but always aim for a full range of motion and a good squeeze at the top,” Dennis points out. “There should be an actual pause at the top of each rep, and a full stretch at the bottom.”

Wolf trains his trapezius muscle on shoulder day, and he has two convincing reasons for doing so. Number one, the traps are involved in any type of overhead press or lateral raise anyway. No matter

how hard you try to isolate the deltoids, the traps are always helping out. They can’t help it; the whole structure is connected. And secondly, training traps on back day would be an exercise in futility. “After a good back workout, I am wiped out,” confides Dennis. “The traps are a strong muscle group and can handle a lot of weight, but even so, I lack the energy to train them hard after my back workout.” Instead, he hits them after delts, and it all works out just fine.

Wolf likes to rotate doing shrugs with a barbell, dumbbells or a machine. The way he does this is to use one of those for two workouts in a row, and then switch to another. “All three ways of shrugging work the

traps in slightly different ways. Even with something like a Hammer Strength machine, you are stressing the traps higher up or lower in the muscle by facing away from the machine or toward it. So by using different tools, you are always keeping the traps in a state of struggling to adapt.”

Dennis felt the need to address proper form and a full range of motion one last time, as proper technique is so frequently violated with shrugs. “Come up all the way like you’re trying to touch your traps to your ears, because I see a lot of guys using the biggest dumbbells in the gym or loading all the weight a shrug machine will hold, and then just doing a little twitch rep where they barely move.”

10 TO GROW ON!

Those are 10 exercises you can use to transform your body into the biggest, freakiest version of your physique possible. As you pack on beef to your chest, back, shoulders and legs, you will take on a look of power that separates you from the average gym rat who only focuses on a couple of body parts. The scale will also set you apart from the rest, as your bodyweight soars to a muscular 200, 225, 250 or more pounds, leaving the realm of the average and stepping into the elite territory of elite bodybuilders like Dennis Wolf.



THE BEST DIET

For Building Muscle Mass

By Brad Schoenfeld, Ph.D., CSCS, FNSCA

THE ANABOLIC DIET

Packing on muscle is not just about what you do in the gym; it requires staunch attention to nutrition, as well. Both the types and quantity of nutrients that you consume will have a profound effect on your muscular gains. In other words, you must eat to grow! The following is an overview of each of these nutritional aspects relevant to muscle building.

CALORIES

No two ways about it: a caloric surplus is necessary if you want to build muscle. This is consistent with the first law of thermodynamics, which states that energy can neither be created nor destroyed—only changed from one form to another. But unless you aspire to look like a sumo wrestler, the key here is to maintain calories in a range that promotes the development of lean mass rather than body fat. Depending on training experience, you can expect to gain a maximum of about one-half to one pound of muscle per week. Any increases in bodyweight over this amount will inevitably be in the form of unsightly fat.

To enhance lean muscle gains, aim to consume between 18 and 20 calories per pound of bodyweight. For instance, if you weigh 175 pounds, your target caloric intake should be approximately 3,150 to 3,500 calories a day. Understand, though, that this figure simply provides an estimate of calories needed; you must then experiment to find out what works best for you. Those who gain fat easily typically do better with a slightly lower caloric intake while “hard gainers” who have difficulty packing on muscle may need to consume significantly more—perhaps as much 25 calories per pound of bodyweight.

The best way to ensure that you’re consuming the proper amount of calories is to follow the “rule of 100.” Start off by consuming 18 to 20 calories per pound of bodyweight for a month or so. If you aren’t gaining enough mass, increase intake by an additional 100 calories a day; if, on the other hand, you are gaining too much fat, cut back intake by 100 calories a day. Evaluate your progress after a few weeks and continue tweaking in 100-calorie increments as necessary. Making these adjustments in a systematized fashion will allow you to fine-tune your diet so that gains in the muscle/fat ratio are optimized.

PROTEIN

You probably know that muscle, like all bodily tissues, is comprised of protein. In fact, muscle makes up more than 60 percent of the body’s protein mass.¹ Protein status in the body is determined by nitrogen balance (nitrogen is the compound that makes protein unique): a negative nitrogen balance means your body is breaking down proteins at a greater rate than it’s synthesizing them; a positive nitrogen balance means your body is creating new proteins faster than it is breaking them down; and a stable nitrogen balance means protein degradation and protein synthesis are in equilibrium. Based on this information, it should be apparent that a protein-rich diet is essential for optimizing body composition. If your intake of protein is not sufficient to make up for what is excreted, cellular function is comprised and

your appearance, as well as overall health, inevitably suffers. Only by consuming protein in excess of losses (i.e., positive nitrogen balance) can you promote anabolism and enhance the quality of your physique.

Research clearly shows that serious lifters need substantially more protein than the average couch potato. No surprise here. Additional protein is critical to repair and remodel muscle tissue damaged by resistance training. How much do you need? Studies indicate that an intake of 0.7 to 0.9 grams per pound is required to support anabolic processes in those who lift weights.^{2,3} This may actually be understating protein requirements if you train hard and heavy as amino acids—the building blocks of protein—can supply up to 10 percent of the body's energy needs during intense, high-volume exercise. Taking all factors into account, protein intake should correspond to approximately one gram of protein per pound of bodyweight. This provides a margin of safety, ensuring you never fall into negative nitrogen balance. There really is no downside to the approach: taking in a little extra protein won't hurt; not getting enough surely will.

The branched-chain amino acids (BCAAs) leucine, isoleucine and valine have been shown to drive anabolic processes. Leucine, in particular, is believed to be a key metabolic regulator of muscle-protein synthesis.⁴ It is therefore important that your diet is rich in the essential amino acids, especially BCAAs. The good news is that all animal-based proteins (meats, dairy products, eggs, etc.) are complete proteins and contain ample amounts of BCAAs. So assuming you eat a variety of animal-based foods and consume the recommended amount of protein (~1 g/lb), protein quality is really not an issue; you are assured of getting all the amino acids you need for optimal development.

If you're worried that consuming high levels of protein might damage your kidneys, rest easy. The belief that high-protein diets are detrimental to kidney function is based on studies carried out on those with renal disease. In otherwise healthy individuals, protein intakes well in excess of one gram per pound have shown no adverse effects on kidney function.^{5,6} Bottom line: unless you have existing kidney issues, a high-protein intake should not pose any problems to your health.

CARBS

There continues to be a prevailing sentiment that carbs are inherently detrimental to body composition. As such, many lifters continue to adopt a ketogenic approach to nutrition, cutting carbs to a bare minimum. Don't let carbophobia sabotage muscular development. If your goal is to pack on lean muscle, carbs can and should have a place in your diet.

Understand that glycogen availability is essential to resistance training performance, particularly when training is carried out for the purposes of maximizing muscular development. Specifically, training with low glycogen reduces the ability to train at high intensities and increases the perception of effort while decreasing power output.^{7,8} Over 80 percent of energy demands during a 12 RM (12-repetition maximum) set to failure are derived from the breakdown of stored carbohydrate.⁹ Studies show that a single set of biceps curls to muscular failure performed at 80 percent of 1 RM causes a 12 percent reduction in mixed-muscle glycogen concentration; three sets at this intensity doubles this decrease.⁹ So if you're glycogen depleted at the start of a workout, your capacity to train intensely will necessarily be severely compromised.

Glycogen levels also have been shown to play an important role in anabolic signaling. Protein synthesis, the driving force behind muscle growth, is dependent on a cascade of enzymes that communicate with one another inside the cell. Studies indicate that pre-exercise muscle glycogen content mediates activity of Akt and S6K^{10,11}—enzymes critical to muscle anabolism. When glycogen levels are low, activation of these processes are blunted, hampering muscle growth. Moreover, an inverse relationship exists between glycogen availability and muscle-protein breakdown, with lower glycogen levels causing greater protein degradation.¹² In fact, nitrogen losses—a marker of muscle protein breakdown—have been found to more than double following a bout of exercise in a glycogen-depleted versus glycogen-loaded state.¹³ All

things considered, maintaining a high intramuscular glycogen content at the onset of training is important to muscle development.

Now, this shouldn't be taken to mean that you need to load up on carbs. Quite the contrary. Evidence shows that eating a high-carbohydrate diet does not have any greater effects on strength or lean mass accretion compared to a moderate-carbohydrate diet.¹⁴ From a muscle-building standpoint, most people seem to do best consuming around two grams of carbs per pound of bodyweight. At suggested caloric intakes, this equates to a diet consisting of roughly 40 percent carbs. As with total calories, this amount should be tweaked based on individual response. Those who are insulin insensitive (characterized by a impaired ability to store carbs in the muscles) may require a



“TAKING IN A LITTLE EXTRA PROTEIN WON'T HURT; NOT GETTING ENOUGH SURELY WILL.”

somewhat lower intake to avoid excess fat storage, perhaps as low as one gram per pound, while hard-gainers might need as much as three grams per pound. Experiment with different amounts and see what works best for you.

The type of carbs consumed is also of importance. Avoid the temptation to scarf down gobs of highly processed carbs. Processing removes valuable nutrients from the food so that you're left with nothing but empty calories. Rather, focus on nutrient-dense sources that are replete in vitamins, minerals and fiber. Whole grains, fruits and veggies top the list here. Many of the vitamins and minerals in these foods are used as co-factors that enhance metabolic processes. Others serve as antioxidants that keep cells functioning optimally.

FATS

The “fat free” craze of late 20th century has come and gone, and most people now realize that dietary fat is an important component in a diet. If nothing else, fats are an essential nutrient and play a vital role in many bodily functions. They are involved in cushioning your internal organs for protection, aiding in the absorption of vitamins and facilitating the production of cell membranes, hormones and prostaglandins. Physiologically, it would be impossible to survive without the inclusion of fats in your diet.

What is less known is that dietary fat helps to promote anabolism. Specifically,



the fats you consume impact testosterone levels. The importance of testosterone in building muscle is incontrovertible. There is clear evidence that testosterone increases protein synthesis and attenuates protein breakdown,^{15,16} as well as potentiating the release of other anabolic factors such as growth hormone¹⁷ and IGF-I.¹⁸ Interestingly, studies show that testosterone levels are suppressed with the consumption of low-fat diets.¹⁹ Studies show that saturated and monounsaturated fat consumption increase testosterone production best.²⁰ Here's the kicker: lifting weights appears to heighten these testosterone-boosting effects²¹; in other words, fat intake and resistance training have synergistic effects on anabolism. All things considered, at least 20 percent of your calories should come from dietary fat, preferably from monounsaturated fats (found in olive oil and various nuts) and omega-3 polyunsaturated fats derived from fatty fish.

It is particularly important that you consume adequate amounts of omega-3 (n-3) fatty acids, a type of polyunsaturated fat found primarily in cold-water fish and to a lesser extent in various seeds and nuts.

It has been well documented that n-3s are vital to numerous bodily processes, including anabolism. Numerous studies show that n-3 supplementation results in greater lean mass accumulation in both animals^{22,23} and humans.^{24, 25, 26} This is believed to be due, at least in part, to n-3 regulated increases in cell membrane fluidity.²⁷ Cell membranes are vital for regulating the passage of nutrients, hormones and chemical signals into and out of cells. When cell membranes are fluid they become more permeable, allowing substances and secondary messenger molecules associated with protein synthesis to readily penetrate the inside of the cell.^{22,23}

N-3s also may enhance signaling of mTOR²⁶—an anabolic pathway widely considered to be a master network regulating skeletal muscle growth. In addition, there is evidence that n-3 supplementation decreases protein breakdown,²⁸ which in conjunction with heightened protein synthesis would result in an even greater muscle hypertrophy. Best of all, n-3s are less efficiently utilized for body fat deposition due to their ability to regulate various thermogenic fat-burning pathways.²⁹ Taking all factors into account, anywhere from five percent

to 10 percent of your calories should come from n-3 sources.²⁹

It is best to get your n-3s from cold-water fish rather than vegetable sources such as flax. Whereas fish contains preformed n-3 derivatives (i.e., EPA and DHA) that regulate the aforementioned bodily processes, n-3s from vegetables must undergo conversion to produce these derivatives. Problem is, research shows that this conversion process is inefficient, with only about only five percent converted to EPA and less than 0.5 percent converted to DHA.³¹ If you don't like fish, consider taking fish oil supplements; they are easy to digest and provide the same benefits as fish consumption.

For the best supplements for building mass, turn to Supplement Performance in this issue.

Brad Schoenfeld, Ph.D., CSCS, FNSCA is widely regarded as one of the leading authorities on training for muscle development and fat loss. He has published over 60 peer-reviewed studies on various exercise- and nutrition-related topics. He is also the author of the best-selling book, The M.A.X. Muscle Plan, and runs a popular website and blog at www.lookgreatnaked.com.

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THE BEST TRAINING TECHNIQUES

For Muscle Mass

By Michael J. Rudolph, Ph.D.,
Senior Science Editor

FORCED REPS, DROP SETS AND HEAVY NEGATIVES

Many types of training techniques promote muscle growth. However, a few techniques have been well documented as having a greater impact on muscle growth and strength. These methods potentially increase mechanical tension on the muscle cell, produce greater muscle cell damage or increase metabolic stress within the muscle cell—all the while stimulating the production of specific anabolic hormones, potentially facilitating muscular development.

Forced repetitions involve assisting the lifter through additional repetitions after concentric failure has been reached. This technique promotes muscle hypertrophy by increasing metabolic stress within the muscle cell emerging from the additionally performed repetitions and supporting an anabolic environment. This hypothesis was investigated by Ahtainen et al. when they tested the effects of forced repetitions on growth hormone release directly after performing forced reps in the squat and leg press. The group that performed forced reps had a significantly higher level of growth hormone secretion, suggesting that the increased metabolic stress from forced reps leads to increased growth hormone production and greater muscle mass.

Drop sets entail performing a set to failure with a given load, then immediately reducing the load and continuing to failure. This technique promotes muscle hypertrophy by increasing metabolic stress within the muscle cell due to extra time the muscle cell spends under tension from the extra repetitions. Furthermore, there has been evidence brought forward by Goto et al. demonstrating that drop sets also enhance the anabolic environment by increasing growth hormone production. In this study, the subjects

ALTHOUGH THERE IS A SUFFICIENT AMOUNT OF EVIDENCE SUPPORTING THE USE OF FORCED REPS, DROP SETS AND HEAVY NEGATIVE TRAINING TO AUGMENT MUSCLE HYPERTROPHY, THESE TECHNIQUES SHOULD NOT BE USED FOR EXTENDED PERIODS OF TIME.

performed five sets of several different lifts to failure at 90 percent of their one-repetition max (1RM), followed by an additional set to failure at 50 percent of their 1RM. This group showed an increased level of growth hormone after their workouts, compared to the control group. More importantly, in a follow-up study, Goto et al. showed a positive correlation with amplified growth hormone levels and increased muscle size.

Heavy negatives focus on the eccentric portion of the lifting movement while using a greater amount of weight than the subject's 1RM. Given that the typical lifter is approximately 20 to 50 percent stronger during the eccentric phase of the movement compared to the concentric portion of the movement, heavy negatives typically produce greater muscle tension and muscle damage—producing greater muscle growth. The greater muscle growth associated with heavy negative training has been documented by Eliasson et al. to correlate with an increase in production of IGF-1. IGF-1 has been shown to initiate muscle repair due to acute muscle damage from resistance training. In addition, IGF-1 contributes to muscle hypertrophy.

Although there is a sufficient amount of evidence supporting the use of forced reps, drop sets and heavy negative training to augment muscle hypertrophy, these techniques should not be used for extended periods of time. They should be incorporated into the workout for a few weeks at a time in order to boost muscle hypertrophy and strength.





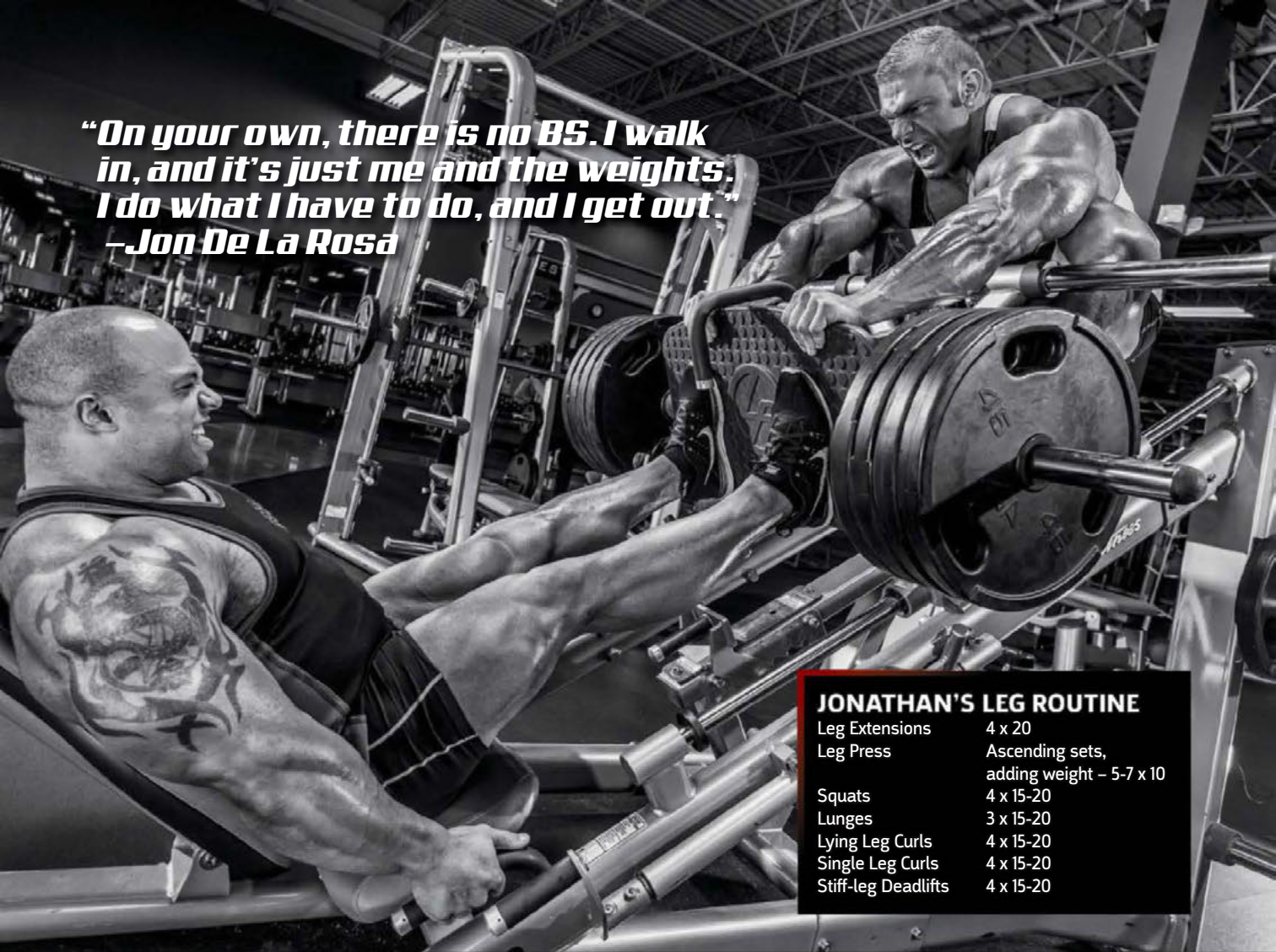
4 WHEEL DRIVE

Justin Compton and Jonathan De La Rosa Talk Building Monster Legs

BY RON HARRIS
PHOTOGRAPHY BY GREGORY JAMES

They placed first and second earlier this contest season in Orlando, and both of these Young Guns are known for their outrageous lower body development. Justin's billowing quads have been compared to those of Arnold Classic champ Dennis Wolf, and Jonathan De La Rosa has legs, hams and calves that are almost impossibly thick and dense. We got these two 20-something champs together to find out how they built those killer wheels, and what advice they have for the MD readers looking to own their own pair of sick quads and hams.





"On your own, there is no BS. I walk in, and it's just me and the weights. I do what I have to do, and I get out."
—Jon De La Rosa

JONATHAN'S LEG ROUTINE

Leg Extensions	4 x 20
Leg Press	Ascending sets, adding weight – 5-7 x 10
Squats	4 x 15-20
Lunges	3 x 15-20
Lying Leg Curls	4 x 15-20
Single Leg Curls	4 x 15-20
Stiff-leg Deadlifts	4 x 15-20

RH: What was your early leg training like, and what kind of results did you experience?

Justin: I first joined a commercial gym at age 16, and I focused mostly on squats for my legs. Some guys avoid them, but I never did. I actually learned to love them right away. Even though I didn't have much of a mind-muscle connection with my legs, they responded very well. My squats were always at least to parallel, if not lower. Legs are definitely an area I was born with really good genetics for.

Jon: Unlike some kids, I did legs from day one and always had a dedicated day for them. That was thanks to the guidance of my dad. They got large fairly quickly as soon as I started banging away hard on them. My arms and my legs were the two body parts that always responded the easiest for me. Everything else was more challenging. They were strong, too. I remember being 17 and during Hell Week for high school football, I did 405 for four reps.

RH: How is your leg training these days different from what you did in your first couple of years of training? Would you say you train a lot smarter now?

Justin: It's not significantly different in many ways. I use more volume now and obviously the weights are heavier as I've gotten bigger and stronger. One thing that changed is my intensity factor. I started watching instructional videos made by Tom Platz where he explains how the mind is such a key in taking your leg training to that next level. Your body will want to quit long before it's truly spent, and it's your mental power that allows you to break past that barrier.

Another excellent tip I got from Tom was to point my knees and toes a little outward when I squat, instead of straight ahead like we're told we have to. Until I did that, squats didn't feel too great for my knees because I was trying to force my body into a position that wasn't natural for it. We all really do need to find the form that's best for us instead of just doing what someone says everybody needs to do.

The last change is a lot more recent. For years, I trained legs in running or basketball shoes. I got a pair of Olympic lifting shoes from Reebok with a hard heel, and now I can drive with my quads instead of from the heel. What a difference it's made.

Jon: I know some people will say this doesn't sound very hardcore, but I mainly chase the pump now. That doesn't mean I go light, it just means that if I can't feel the muscle working and I can't get that really good pump I'm after, I don't go heavier. For example, I haven't really moved up in weight on squats over the years. I still do 405, but now I do it for sets of 15-20 instead of 10-12. As a younger guy, I wasn't putting anywhere near as much focus on squeezing and contracting the muscle. Now it's everything. Lifting weights from point A to point B is not going to give you the development of a bodybuilder. You need to push a lot of blood into the muscles.

RH: Did you always put as much time and effort into legs as you do now, or was there a time when you focused more on the upper body as a lot of guys do?

Justin: There was actually a period of a full year and a half when I didn't train legs at all, but it wasn't because they were ahead of my upper body. At age 20, I was in school and

decided I would compete in the Collegiate Nationals that were a year away. Then all of a sudden, I developed this terrible pain in my right knee. It was diagnosed as Osgood-Schlatter disease, an inflammation and swelling of the anterior tibial tubercle. Usually it happens to adolescents while they are growing, and goes away on its own in a few months.

I kept training legs for about three or four months, and the pain was excruciating. Not only that, I couldn't get any kind of pump in my right leg even when I did single-leg movements. That quadriceps just would not fire. So I said screw it, and quit training legs. I abandoned my plan to do the Collegiates, because there was no way I was going up there with crappy legs.

So a year and a half went by. One day, for the hell of it, I decided to try a set of very light squats. To my surprise, the pain was gone. That was 18 weeks out from a big regional show called the Kentucky Muscle Classic. I started hitting legs again and thankfully that issue had resolved itself. By the time I got onstage and won that show, my legs were already so

developed that they said I was a little bottom-heavy!

Jon: At one point when I had done well at a few regional shows and was in my off-season before I entered and won the Junior Nationals, it was very clear to me that my legs were way ahead of my upper body. I took about four or

JUSTIN'S LEG WORKOUT

Leg Extensions	3 x 20-30
Squats	3-4 x 12-15 (warm-ups)
	3 x 12-20
Hack Squats	4 x 12-20
Leg Press	4 x 12-20
Seated Leg Curls	4 x 12-20
Reverse Hack Squats	4 x 15-20
Lying Leg Curls	4 x 12-20





five months off from training them, **and used that** time and energy to hit my upper **body muscle** groups twice as frequently. I was **doing chest** every other day, shoulders every other **day, and back** every other day. It worked out well, **and once those** areas had caught up I went back to **working my** legs again.

RH: Why do you think we see a lot of lagging lower bodies among bodybuilders? Where are they going wrong?

Justin: Probably mental focus. **A lot of guys** just don't have their heads into what **they're doing**. Once the weight starts **feeling heavy**, **they're all** done. To really work hard and get **the most out of** exercises like squats, hacks and **heavy leg presses**, you need to put **yourself in another world**. I like to pick a spot on the wall in front of **me and just focus** on that and block out everything **else. And let's** be real. Leg training isn't fun the **way chest or arm** training is. It's very hard work and **it takes a lot out of** you. Most guys just won't put the **work into it** that needs to be done if you want great **legs**.

Jon: There are a few **reasons I can think of**. A lot of guys don't train legs very hard, **and they always** seem to have an excuse like **knee pain**. The reason they have that pain is also a **reason their legs** don't grow very well—bad form. **They do everything** in a ballistic manner, which will **wreck anybody's** knees, lower back and hips. If you **use good form** and focus on keeping a specific **muscle under** tension, you will get results.

A lot of guys do things to handle **more weight**

like a sumo stance on squats or partial range of motion. If you ever saw guys with the best quads like Ronnie Coleman or the late Paul DeMayo squat, it was shoulder width and past parallel. The reps were controlled and smooth like a piston, with no snapping at the top or bouncing at the bottom.

Speaking of squats, a lot of guys don't even squat! There are so many cool, shiny machines out there that it's tempting to think those are just as good. Look at every bodybuilder who ever built impressive quads, and they all built them by squatting.

RH: Which exercises do you feel have been the most productive for you? And what rep ranges do you feel have given you the best results?

Justin: For quads, it would be squats, hack squats, heavy leg presses and leg extensions. Leg extensions are really underrated, in my opinion. My hamstrings always responded well to seated leg curls and lying leg curls.

As far as rep ranges, I do think you need a wide variety. Four to six reps can work very well for building power and muscle density. Higher reps are great too, but you need to know when

JONATHAN'S CONTEST HISTORY

2005 NABBA Junior Nationals	Junior and Open Overall
2007 NPC Eastern USA	Second, Light Heavyweights
2009 NPC Atlantic States	Light Heavyweight and Overall
2009 NPC Junior Nationals	Light Heavyweight and Overall
2010 NPC USA Championships	Second, Heavyweights
2011 NPC USA Championships	Heavyweight Winner
2012 IFBB New York Pro	Fifth Place
2012 IFBB Toronto Pro	Second Place
2013 IFBB New York Pro	Fourth Place
2013 IFBB Toronto Pro	Third Place
2014 IFBB Arnold Brazil	Third Place
2014 IFBB New York Pro	Third Place
2014 IFBB Toronto Pro	Third Place





to use them best. For example, on squats I find I can't go higher than 20-25 reps without lung capacity being a limiting factor. Platz used to do crazy things like 405 for 50 or squatting 225 for 10 minutes nonstop, but he was one of a kind. I find higher reps are better suited for machine movements like the leg press and hack squat.

Jon: Squats are number one, hands down. The rep range that I have found works best is 15-20, and that's not just for legs. Most guys never give the higher reps a chance, but they would be shocked at how well they stimulate growth. It's also a lot safer in the long term for your knees and your lower back when you aren't loading up a bar with something you can only get a few reps with.

RH: Are there any leg exercises you never do, either because you feel they are not productive for you, or not safe?

Justin: Lunges never really felt right to me, at least not with a barbell or dumbbells. At a gym I used to train at in Louisville, I used to do them with a safety squat bar and those were better. Stiff-leg deadlifts are another exercise I just never felt the groove on. Instead, I do those reverse hack squats that Dennis Wolf used to bring his hams up, or rope pull-throughs where you pull a rope cable pulley from between your legs. Front squats are another exercise I've never gotten the maximum potential out of. I can't do them early in the workout when I'm still strong. The bar either comes back to my throat and starts choking me once I get past 275, or it starts rolling off my shoulders.

Jon: I do pretty much every exercise. The only one I have to be careful with is front squats, which I don't do as often. The bar has a tendency to roll back on my neck, and I've had a few close calls when I almost choked myself out! Juan does them all the time, but he has those giant shoulders. He's in no danger!

JUSTIN'S TRAINING SPLIT

Sunday: Back
Monday: Chest
Tuesday: Shoulders
Wednesday: Back
Thursday: Chest
Friday: Legs
Saturday: Arms

JONATHAN'S TRAINING SPLIT

Sunday: Chest
Monday: Back
Tuesday: Delts
Wednesday: Legs
Thursday: Arms
Friday: Chest and some delts
Saturday: Hamstrings

***"Most guys never give the higher reps a chance, but they would be shocked at how well they stimulate growth."
—Jon De La Rosa***





JUSTIN'S CONTEST HISTORY

2007 Monster Mash Natural
2008 NPC Natural Ohio

Second, Juniors

Teen Winner; Third, Juniors; Fourth, Men's Open, Light Heavyweight

2008 NPC Cincinnati

2010 NPC Kentucky Muscle

2011 NPC Junior Nationals

2011 NPC Nationals

2012 NPC Nationals

2013 IFBB Chicago Pro

2014 IFBB Europa Orlando

Second, Heavyweight

13th, Heavyweight

Heavyweight Winner

Fifth Place

Winner

RH: Some people feel the legs respond to a much higher volume of training than what the upper body muscle groups usually get. Do you agree or disagree?

Justin: I agree to a point. I think you should use a little more volume, but you can get carried away with that too. Some guys take over two hours to train legs, and that's a bit much.

Jon: Legs can take a little more of a beating than the other muscle groups, for sure. But just like with higher reps, I found that high volume works very well for making good gains too. People are so paranoid about overtraining that they never even try to see what more volume can do for them. As long as you're eating enough and getting your sleep, you can get better results by doing more. Within reason, of course.

RH: Do you do mostly regular straight sets in your leg training, or do you do a lot of supersets and drop sets?

Justin: In the off-season, I will do mostly straight sets. Once I am into prep, I get lighter and I'm doing more cardio, so my muscle endurance is better. I'll do things like drop sets on the leg press, super sets and giant sets. Squats are always done as straight sets, but I will sometimes do

a giant set of leg extensions, hack squats and squats using a safety squat bar.

Jon: I like straight sets most of the time. When I was training for the Mr. Olympia, I liked doing drop sets and ascending sets on the leg press to push myself a little harder. For the ascending sets, I would do sets of 10 and keep adding a plate to each side, taking only enough time between to add the plates, until I couldn't get 10 reps anymore.

RH: What rep tempo works best for your legs—slow and squeezing, or faster and more like a piston, with no pausing at either the top or the bottom of the rep?

Justin: I like to do an explosive positive, and a controlled, slower negative. That's the way I learned to train when I was a kid, and it's worked very well for me. My reps will usually take about two to four seconds each.

Jon: Slow, controlled movements are what I feel are best.

RH: Do you feel most bodybuilders would be better off training the quadriceps and hamstrings at different workouts?

Justin: I've always trained quads and hams together in the past. I would either do one of them first in the workout, or

alternate quad and ham movements.

This year, I increased my overall training volume across the board, and I found that whichever of those two muscle groups I trained second would suffer. So now I do train them separately.

Jon: That's really up to the individual and what they feel. Some guys feel they can't do justice to both in the same workout. I've never felt that way, personally. To me it's just like doing both biceps and triceps in the same workout. It's one reason I do squats later on in my quad workout. I find they make a good segue into hamstrings, since deep squats are going to involve your hams as well as your quads. From there I go into various types of leg curls.

RH: Should the legs be trained twice a week if they are lagging, or is that too much to be able to recover from?

Justin: I've tried it a couple of times, and both times were a fail for me. Within two weeks, my patellar tendons started to ache all the time from overuse. You could argue that shorter workouts would put less of a beating on them, but I feel I get more from a more substantial leg workout. You have to respect your knees and take care of them. Once those go, good luck!

Jon: I think twice a week is too much simply because it's a large volume of sheer muscle mass. If you're truly doing a good job training them, they will need a minimum of three days and probably four to fully recover. If you work them again and incur that damage to the muscle cells before they have repaired and rebuilt, you won't be able to grow. You might even see a loss of size in your legs.

RH: What about form for leg exercises? Should it always be strict, or is there a time and place for looser form too?

Justin: I can't emphasize enough that squats and stiff-leg deadlifts should always be done with strict form. I've spoken at length with a couple of chiropractors, and they were adamant about how easy it is to herniate a disk using loose form on those. One exercise I think it's fine to loosen the form up on at times is the leg extension. You can start a

set off with your butt flat on the pad and using a full range of motion, but when you fail that way you can lift up off the seat to shorten the range of motion and get a few more partial reps.

Jon: I'm a stickler for good form. That being said, I do believe it's OK to let loose once in a while and just move some heavy fucking weight! For me, that will tend to be in the off-season when I'm feeling good, my joints are feeling fine, and I'm training with guys like Juan, Victor and Akim. If they are going to put some big weights up, so will I. But if I'm closer to a show, I won't do that. I will still go as heavy as I can, but with good form and controlling the weight at all times.

RH: Is leg day a training day when you feel a training partner is especially valuable?

Justin: Of all the training days, I would say legs are the one I would want a training partner. I'm highly motivated, but even I have those days when I need a little push. It's also good for doing things like drop sets on the leg press. Just having a partner for the leg

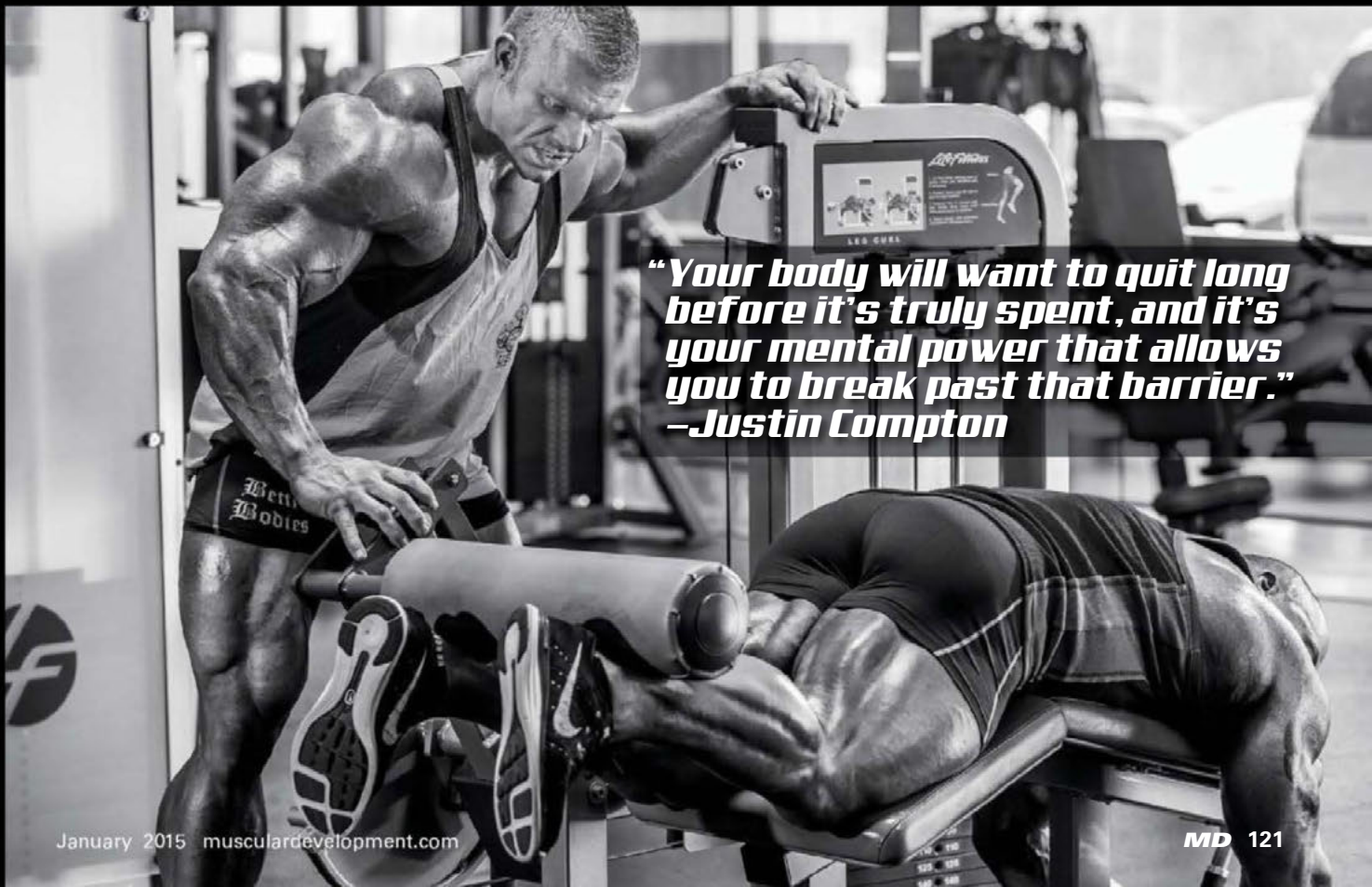
press to help out with loading and unloading all the plates is a good thing!

Jon: For me, no. I think if you're in tune with what you have to do, there is no need. I genuinely love training, and I love training by myself. Since I started my business, Nutrition Locker, many times I don't get into the gym until 9:00 p.m. It's tough finding someone who wants to train at that hour. And that's OK. On your own, there is no BS. I walk in, and it's just me and the weights. I do what I have to do, and I get out.

RH: Are you happy with your leg development now? If not, what would you like to improve on?

Justin: They've come a long way. Looking back at my last show in Orlando, I was happy with my quad sweep and detail. From the side, Jonathan blew me away with his hamstrings, and that whole glute-ham area. I want my legs to look like that in side poses!

Jon: I am pretty happy with my legs. I just want a little more size everywhere on my physique, so I would include legs in that.



"Your body will want to quit long before it's truly spent, and it's your mental power that allows you to break past that barrier."
—Justin Compton

THE 2014 IFBB PRO BODYBUILDING REP

BY DAN SOLOMON

When you boil it down, the sport of competitive bodybuilding is a nonstop, 24-hour evaluation. We calculate progress. We gauge regression. It's the ultimate scorecard, a blatant act of subjectivity. Bodybuilding is a sport of OPINION ... and here at MD, there's never a shortage of that. So, as we prepare ourselves for the start of a new year in bodybuilding, let's sharpen our pencils and fill out our unofficially "official" report card for the 2014 season. We've chosen a handful of topics, the ones that created the most buzz, and a letter grade has been assigned. These grades are FINAL ... the deadline for extra credit has passed!!!



"TYPICALLY A 'STRAIGHT A' STUDENT, HEATH'S GRADE IN 2014 TOOK A SLIGHT DIP ... AND WE ALL EXPECT HIM TO STUDY A BIT HARDER IN 2015."

TOPIC: THE HEATH PHYSIQUE

Unfortunately for the reigning champ, we grade on a pretty harsh curve. Phil Heath has raised the bar so high for himself that we are forced to give him a less than stellar grade for 2014. That resplendent three-dimensional detail that he's delivered in years past wasn't quite as crisp this time around. The lower back, glute and hamstring detail wasn't as jaw-dropping as in years past and his midsection gave way to subtle distention, a reality that even Phil's biggest supporters wouldn't deny. Typically a "straight A" student, Heath's grade in 2014 took a slight dip ... and we all expect him to study a bit harder in 2015.

Grade: B

"KAI AND HIS TEAM FOCUSED ON PLAYING TO THEIR SIZE ADVANTAGE ONCE AGAIN. THE STRATEGY BACKFIRED AND A GOLDEN OPPORTUNITY WAS WASTED."



KAI'S STRATEGY

All of us here at MD are huge fans of Kai Greene. His combination of freaky muscle and size has made him the primary obstacle on Heath's road to a dynasty. Coming off the 2013 season, we felt strongly that the Olympia runner-up needed to re-evaluate his strategy and craft a slightly smaller, more conditioned package for the 2014 Olympia. Unfortunately, it turned out to be more of the same. Kai and his team focused on playing to their size advantage once again. The strategy backfired and a golden opportunity was wasted. An eight- to 10-pound reduction could have resulted in the realization of Kai's Olympia dream, but in the end, the only dreams that came true were those of his rival. 2015 might be Kai's last legitimate shot at Phil's title, but it can only happen if his strategy changes.

Grade: C

PORT CARD

WISDOM OF WOLF

After years of volatility, Dennis Wolf has found his rhythm. The most aesthetic of the contenders, he opened the 2014 season by securing the win in Columbus that he had long coveted. Later in the year, he landed on center stage with Arnold yet again when he won the Arnold Europe in Madrid. Despite the occasional struggle to achieve peak condition and fullness, Wolf has quietly emerged as one of the safest bets in the business. While many of his adversaries struggled to consistently perform during the post-Olympia world tour, Wolf managed to achieve a notable level of consistency. This grade would have been an "A" if Dennis had made more gains, but his consistency earns him higher marks than men named Phil and Kai.

Grade: B+



"WHILE MANY OF HIS ADVERSARIES STRUGGLED TO CONSISTENTLY PERFORM DURING THE POST-OLYMPIA WORLD TOUR, WOLF MANAGED TO ACHIEVE A NOTABLE LEVEL OF CONSISTENCY."



REVIEWING RAMY

At only 30 years old, Big Ramy remains among the youngest of the contenders. The only thing larger than the man himself is the ENORMOUS expectations. To be fair, Ramy has only competed four times as a professional. He's won the New York Pro twice, and he's competed in two Olympias, placing eighth and seventh, hardly a disappointment. He earns a solid "B" in 2014 because he was good, but still struggled to achieve a level of conditioning to pose a legitimate threat. With two full years under Big Ramy's belt, we are expecting improvements here in 2015. His grade will improve when his conditioning does.

Grade: B

"WITH TWO FULL YEARS UNDER BIG RAMY'S BELT, WE ARE EXPECTING IMPROVEMENTS HERE IN 2015. HIS GRADE WILL IMPROVE WHEN HIS CONDITIONING DOES."

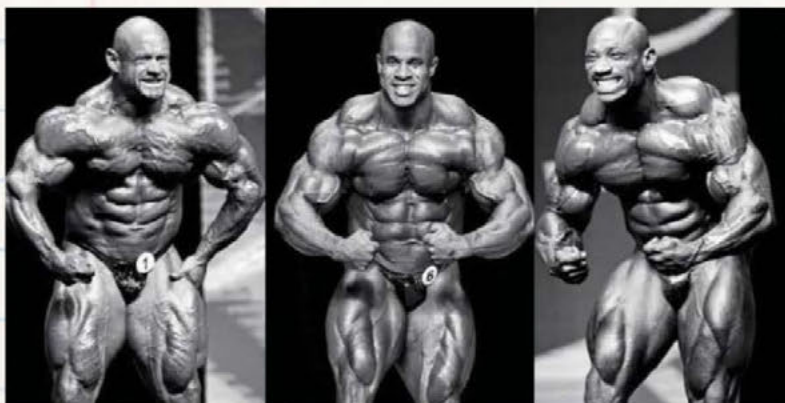
THE 2014 IFBB PRO BODYBUILDING REPORT CARD



"AS IT TURNS OUT, 2014 WAS ACTUALLY A VERY GOOD YEAR FOR THE MEN AND WOMEN WHO SIT AT THE TABLE."

THE OLD GUARD

Joe Weider often said that bodybuilding provides the keys to the Fountain of Youth. In 2014, further evidence was provided when veteran bodybuilders Dexter Jackson, Branch Warren and Victor Martinez proved that age and injury is no match for heart and work ethic. In the case of Dexter, he not only remained among the top five in the world, but he also managed to win his 20th pro event (Dubai) at nearly 45 years old. As for Branch, he overcame all the doubters and reclaimed a coveted spot among the Olympia's top six. And then there's Victor. After struggling a year ago, he returned in 2014 to win another title (Tampa) and appears to have positioned himself for another solid year on the pro circuit. For those predicting a changing of the guard, it appears that neither of these gentlemen received the memo. **Grade: A**



"IF YOU'RE LOOKING FOR THE YEAR'S TOP PERFORMER, DON'T LOOK TO ANY INDIVIDUAL ATHLETE. THE TOP PERFORMER WAS THE SPORT AS A WHOLE. 2014 WAS A BANNER YEAR FOR BODYBUILDING."

RIVALRIES & DRAMA

For many fans, bodybuilding is only as good as its rivalries. Each year we watch as the contest schedule gives way to new storylines and new battles. Unfortunately for drama-seekers, 2014 was relatively quiet on the drama front. Very few shots were fired among the athletes and as a result, storylines were slow to develop. This category was on track for a solid "F," but thanks largely to a spirited Mr. Olympia press conference and some onstage antics, it earned a slight 11th-hour bump. Here in 2015, we are hoping to see a return of some of the theatrics that once ruled the day. **Grade: C+**

Official
IFBB
FINAL RESULTS
Scorecard

COMPETITION: 2014 IFBB MASTERS MEN'S BODYBUILDING OVER 40
DATE: August 28, 2014

PL	NAME	COUNTRY	JUDGING	FINALS	TOTAL
1	Dexter Jackson	New Jersey			
2	Branch Warren	Florida			
3	Victor Martinez	Canada			
4	...	Kentucky			
5	...	Ohio			
6	...	New Jersey			

JUDGING THE JUDGES

Criticizing the judges ... it's one of the bodybuilding world's favorite pastimes. Moments after a contest ends, the noise around the venue is typically laced with comments like, "Were the judges wearing their f%&\$ing glasses?" As it turns out, 2014 was actually a very good year for the men and women who sit at the table. Controversy was kept to a minimum, and most importantly, the physiques were held to the correct standard. Conditioning was rewarded, standards were consistent and placings (for the most part) were well received. In a sport with very little separating first from fifth, the task of judging world-class physiques isn't an easy one. In 2014, the judges were up to the task.

Grade: A- (the minus is our tip of the cap to everyone who felt they were overlooked)

OVERALL GROWTH

How does one measure the growth of an entire sport? In the case of professional bodybuilding, no matter how you measure it, the results are impressive. Under the direction of Jim Manion, the IFBB's Professional League has enjoyed increases in overall popularity, prize money, ticket sales and sponsor revenue. Endorsement deals are becoming more and more lucrative, and international events are on the rise. If you're looking for the year's top performer, don't look to any individual athlete. The top performer was the sport as a whole. 2014 was a banner year for bodybuilding.

Grade: A+

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TESTOSTERONE WARS

Science Versus Political Science

Medicine must be based upon facts and evidence-based findings, observation and monitoring; performed with the best interests of the patient and society central to decisions and policies. What should not influence medical decision-making or informed consent of the patient are prejudiced opinions, media sensationalism, positions taken for political or financial gain, as well as fraudulent or misleading conclusions.

Human health is not an absolute matter of “hard science,” dictated by objective and measurable responses that can be categorized by mathematical formulas into defined states. It would be wonderful and simple if that were the case. Even in accepted examples, identifying a threshold value for a diagnosis generally results in treating the consequences of the disease, rather than the cause(s). Type 2 diabetes mellitus may be defined by fasting glucose, OGTT response or HbA1C values—all lab values from blood samples. However, it has now been determined that pre-diabetes has metabolic and health consequences. Similarly, the definition of hypertension (high blood pressure) now recognizes a window of opportunity in treating pre-hypertension. Imagine if the effort and support in lowering LDL cholesterol (long considered a minor risk factor in cardiovascular disease) was applied toward addressing these conditions.

MEN'S HEALTH NEGLECTED

The field of men's health (for lack of a better term, though “andrology” is used by some) has been neglected and discredited for decades, as is evident in reading the seminal book, *The Male Hormone* by Paul de Kruif. There are numerous issues with the early introduction of androgen therapy during the 1930s and 1940s, but the objectionable stance held by American Medical Association (AMA) was that older men should not desire “rejuvenation” or sexual restoration. It was the opinion of AMA leaders that aging men should accept senescence (declining function due to aging), and that restoring sexual function and desire in aging men was neither natural or beneficial to the individual or society.

Testosterone and other anabolic-androgenic steroids (AAS) had little demand as medical therapy well into the 1990s. Instead, attention and interest related to the ability to increase muscle mass and strength, predominantly used by athletes and bodybuilders. During this time, the campaign to fund anti-doping efforts painted AAS as dangerous and unethical drugs. This tied in nicely with the need to define AAS as addictive and harmful drugs to justify their scheduling as Controlled Substances by the U.S. Food and Drug Administration (FDA). To this day, AAS are not generally recognized as being classically addictive drugs—despite the efforts of certain researchers.

Unfortunately, there remains an evident but ignored bias against “quality of life” therapies; particularly as they relate to men. Some may point to the emergence of erectile dysfunction drugs (e.g., Viagra) as proof that men have benefited from recent drug development. In fairness, one might concede that point, or use it as evidence of the gender bias against men. PDE5 inhibitors, Viagra-class drugs, were approved with little understanding of their effects beyond the obvious and immediate. Erectile dysfunction is a sign of a broader disease state (e.g., vascular disease, hypogonadism, depression, etc.).

VIAGRA AND SAFETY CONCERNS

Shortly after the approval of Viagra, a rash of deaths occurred in men with coronary artery disease.¹ Yet, there was no clamor for the drug to be removed or more stringent monitoring to be in place. Instead, major competitors raced for quickly granted approval of their own PDE5-inhibitor drug. There has never been a call for a long-term clinical trial to assess the “safety” of this class of drug (or most others, including statins). The major advantage of competitor entries was a longer-lasting effect, and these drugs were among the most marketed via direct-to-consumer advertising.

Regulatory agencies and the pharmaceutical industry served primarily older men by providing a potentially deadly drug to provide

a quality-of-life benefit (potentially masking the progression of serious underlying pathology). The pharmaceutical industry benefited to the tune of billions of dollars. Certainly, many men benefitted from PDE5-inhibitor drugs. Frankly, the development of this class is a welcome addition to the treatment options for “men's health.” Since then, little advance has been made in new drugs for men. It would be interesting to know what the AMA leadership of the 1940s would have to say about PDE5 inhibitors. Seemingly, the priority for the regulatory agencies and the pharmaceutical industry now is to give men a “boner in a bottle” and expect them to be placated. Compare this to women's health.

WOMEN'S HEALTH AND FEMALE HRT

The “change” known as menopause is fairly rapid, and the effects are noticeable. From “hot flashes,” to facial hair, to bone loss and cardiovascular disease, the loss of sex hormone production from the ovaries is considered a treatable condition. This was essentially unchallenged until a study, the Women's Health Initiative, called the safety of hormone replacement into question.² Overnight, many women stopped taking estrogen and/or progesterone due to the fear created. The study has been challenged by many, and it appears that HRT for women is relatively safe if begun during or shortly after the onset of menopausal symptoms.

There are risks with female HRT (e.g., stroke, acceleration of certain cancers), and women should be advised of such prior to making an informed consent to receiving HRT. Menopause treatment is based upon symptoms, how the lady feels, rather than lab values. The early benefits often impact quality of life (e.g., skin and hair texture, mood, sexual function), rather than treat a specific pathology (e.g., bone loss, cardiovascular risk). Women's health clinics are found in nearly every town and city, yet there is a dearth of men's health clinics—other than those aimed at treating prostate- and impotence-related issues.

In contrast, there is no urgency in ad-

addressing the common decline in sexual desire experienced by many women, including premenopausal women.³ A variety of agents have been developed or studied, including PDE5 inhibitors, testosterone, etc. However, the FDA has struck down each application, stating a lack of long-term safety data or questionable efficacy. It has been suggested that the market for a drug or hormone that can restore or enhance female sexual desire would rival that of the erectile dysfunction drugs for men.

THROW THE MEN A BONER PILL

So, men were quickly given “boner pills” to satisfy the desire for sexual activity in those affected by (but rarely evaluated for) a variety of conditions. Men’s quality-of-life issues or proactively responding to a recognized decline in testes function are subjected to stringent laboratory measures with little regard for subjective symptoms, despite the initial awareness being based upon subjective symptoms (e.g., reduced libido, erectile changes, mood, change in strength, body composition, etc.). Women’s health practitioners can respond quickly to the patient, and are not constrained by exaggeratedly conservative laboratory definitions of menopause. However, women’s health practitioners are forced to resort to off-label use of certain drugs when addressing a complaint of a lack of sexual desire by their patient. Men’s HRT involves drugs scheduled as controlled substances, whereas prescriptions for women’s HRT can be written by a health care provider without requiring a DEA [United States Drug Enforcement Administration] registry number.

This bias continues, and appears to be firmly entrenched in the FDA, the regulatory agency that decides whether a drug is approved for use in the United States. The approval process is lengthy and expensive, so pharmaceutical companies only apply when they feel there is a substantial demand and the drug is vetted through clinical trials. The recent overwhelming rejection of yet another testos-

terone formulation by two FDA committees shows that there is a prejudice against allowing any new testosterone-based products on the market. The sources of this prejudice will likely never be known publicly. It has been suggested that this may be due to a combination of: a) the “cover your ass” mentality of federal agencies; b) influence from manufacturers of existing testosterone formulations already approved (and vulnerable to competition from new entries); and c) a lack of support for, or covert antagonism against, male HRT products.^{4,5}

FDA APPROVAL: IT DON’T COME EASY

Two related testosterone products have presented to the FDA for approval, both being based upon the 17beta-ester, testosterone undecanoate (TU). The first, Aveed, approved after multiple delays (five years), is an injectable depot that allows for steady-state concentration (therapeutic levels) lasting up to 10 weeks between injections.⁶ The second is an oral capsule, Rextoro, that is absorbed via the lymphatic system, allowing the drug to bypass the liver. Nebido (injectable TU) and Andriol (oral TU) have been approved for use and administered in various countries, including many in Europe. Nebido, as prescribed in other countries, actually allows for up to 12 weeks between injections, but requires a higher volume injection. The FDA felt that would lead to patient discomfort and increase the risk of an oil emboli, which happens when the injected oil gets into a vein and travels to the lung—and many have experienced a coughing sensation almost immediately following an AAS shot. The oral capsule has the benefit of stabilizing blood concentration of testosterone without “straining” the liver, usually detected by increased liver enzyme or bilirubin results from blood work.

There are clear benefits to Aveed and Rextoro. Aveed allows clinicians (required to be certified by Endo Pharmaceuticals to dispense Aveed) to titrate therapy by increasing/decreasing the duration between injections. Patients have the injections performed in

TESTOSTERONE 2014— A YEAR IN REVIEW

THE CARDIOVASCULAR DISEASE CONUNDRUM

Four contested studies were published prior to and during 2014, questioning the safety of testosterone replacement therapy (TRT) relative to cardiovascular disease (CVD) in men.¹⁻⁴ In response, a consortium of medical professionals and researchers have called for the retraction of one of the articles—they included over 100 women in the male-only study, among other challenges. This CVD-risk hunt was prompted by findings from a clinical trial investigating the use of topical TRT in older men with limited mobility—men over 65 who could not move or walk well on their own.¹ The study in older men, called the TOM trial, was halted because men receiving TRT were experiencing significantly more CVD events than the control group. The TOM trial was argued to overstate any relevant CVD risk as it included non-specific symptoms as CVD events (e.g., premature ventricular contractions, lower extremity edema, fainting, hypertension).² This critique noted those experiencing CVD events had a more rapid increase in testosterone, and a much greater increase in estradiol.

EXPERTS DISPUTE RESEARCH

Now, it is interesting that another, larger trial is commencing that includes some of the investigators from the TOM trial looking again for benefit in men with limited mobility from TRT.⁶ It seemingly indicates that the findings of the TOM trial may be in dispute among experts.

Further, given the arguments against the two observational studies and a related meta-analysis finding an increase in CVD risk with TRT, it is interesting that two larger studies and a meta-analysis review looking at the same issues found the opposite.⁷⁻⁹ AND—the media remained silent.

Historically, there has been overwhelming support from small studies and clinical monitoring to show that TESTOSTERONE DEFICIENCY is associated with CVD (e.g., heart attack, stroke, sudden death), and TRT protects against the same. Extremely high testosterone does not offer greater CVD benefits; instead, it may result in greater risk than normal to high-normal testosterone concentration.¹⁰ Three studies that raised the alarm utilize statistical “weighing” that makes it difficult to assess the data, and at best (or worst), show an association between TRT and CVD in men over 65 or those with prior CVD events. There are also interesting findings in that the majority of CVD events occur within 90 days of beginning TRT, and most of the men were undertreated.

ASSOCIATION DOES NOT IMPLY CAUSATION

So, three recently published studies challenge, actually counter the presumption that TRT causes, or is associated with, CVD. Note, association does not imply causation is one of the central concepts to keep in mind when looking at statistics. Another study reported on 42 people on TRT (including some women), and discovered that 41 of the 42 had a condition that predisposed them to thrombotic disease (e.g., heart attacks, strokes, etc. due to a clot in the bloodstream).¹¹ Yet, pundits and the media are attempting to suggest that TRT may be causing CVD in epidemic proportion.

The medical records of over 25,000 Medicare patients (all men over the age of 65, with TRT provided to 6,355 patients) were reviewed and analyzed, revealing NO ASSOCIATION BETWEEN TRT AND CVD.¹² In fact, when researchers looked at CVD health of the subjects, those at greatest risk of CVD events actually experienced a protective benefit

the clinic, allowing for more frequent follow-up of the patient response and any adverse effects. The oral forms would be markedly safer than any other oral AAS (e.g., methyltestosterone, oxandrolone) in regard to liver function, and more convenient than the current topical options. Further, there would be no risk of transfer—testosterone gel rubbing on to a child or intimate partner, resulting in virilization. The dose is easily titrated by altering the number of capsules prescribed according to patient response and labs.⁷

BIAS AGAINST MALE HRT

The FDA committees involved in recommending approval of Rextoro have overwhelmingly rejected the application, stating that there is insufficient benefit-to-risk profile, and that the product may not even be effective.⁸ This is perplexing, as oral TU would offer an alternative to 17alpha-methyltestosterone (MT), an approved drug in use in the United States. Methyltestosterone is associated with liver enzyme elevations, something the TU formulations avoid. It would also avoid the transfer issue with topical formulations, widely prescribed in the United States. The FDA requires topical formulations to carry a “black box” warning about this risk, so presumably an option that avoids this would carry a clinical benefit.

Instead, the committees have succumbed to the furor raised in the media relating to the limited studies indicating an increased risk of cardiovascular disease in men receiving TRT. This is addressed in the sidebar to this article. Bear in mind, the preponderance of evidence clearly indicates an increased risk of cardiovascular disease, and death in general, in men with low or low-normal testosterone concentrations. Delays caused by this academic challenge may be resulting in patients delaying seeking appropriate health care, and physicians becoming wary of prescribing testosterone in all but the most severe cases.

Lastly, as a clear example of the bias against male HRT, is a statement offered as “testimony” in the committee hearing. “There is no solid evidence that age-related hypogonadism exists or that TRTs are helping patients who take them for this purpose, said Public Citizen’s Michael Carome, who offered testi-

mony at the meeting.”¹⁰ Public Citizen is a political action organization, not a medical association. Among their stated goals is advocating a single-payer, Medicare-like system for all.

Testosterone’s past and future is mired in bias, delaying an understanding and utilization of the therapeutic benefits that might be provided with appropriate treatment guidelines, as opposed to the overly conservative and “least offensive” practices endorsed by our nation’s experts. Associating the USE of testosterone with ILLICIT ABUSE and SPORTS DOPING only serves those opposed to acknowledging the essential and central role the hypothalamic-pituitary-testes axis serves for men, particularly men succumbing to the effects of age and environment.⁹ ■

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from TRT! It should be noted that these men were receiving TRT via intramuscular injection, not topical.

Another study, brought to light at an Endocrinology conference, reported on the experience of over 40,000 men evaluated for testosterone deficiency. Comparing those treated with TRT to the general public, the TRT-treated men had one-seventh the risk of a heart attack, and one-ninth the risk of experiencing a stroke.¹¹ Yes, the general public has a seven times greater risk of a heart attack, and nine times greater risk of having a stroke than the TRT group of 40,000 men. The meta-analysis reviewed 75 qualified studies, finding no association between TRT and CVD in general. In those at risk due to a metabolic condition (e.g., type 2 diabetes), TRT actually reduced risk, in agreement with the Medicare case review study.⁹

A STATE OF CONFUSION

So, the “BIG NEWS” for testosterone in 2014 was the accusation that it increases the risk of CVD events, against nearly all prior experience in the medical literature. Then, the accusatory evidence was contested, perhaps discredited, and then challenged by findings showing either no effect or even CVD protection when therapeutic testosterone concentrations were achieved and maintained.

Where does that leave the general public, or the polarized physicians? In a state of confusion, though it is possible that the confusion may be doing harm to the public by causing people to delay seeking diagnosis and treatment for a condition known to be associated with CVD (testosterone deficiency). The silver lining is that a potential risk may have been identified—TRT in men over 65, younger men with a history of CVD, or those with a pro-thrombotic condition (clotting disorders). Also, it is important to track changes in estrogen during treatment, particularly during the first 90 days. Unfortunately, instead of seeking answers, it is in the hands of those seeking a marketing advantage, media attention or political gain.

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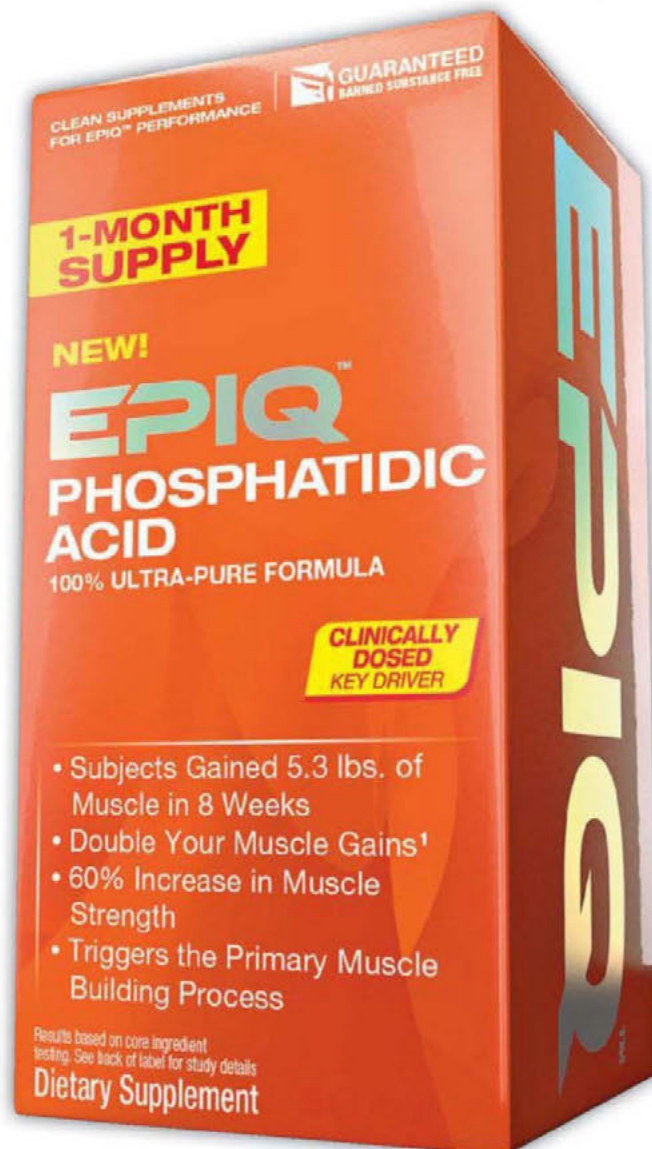
In a double-blind, placebo-controlled clinical study conducted at the University of Tampa and published in the journal *Nutrition & Metabolism*, resistance-trained athletes who trained three times per week and supplemented with PA over eight weeks put on double the muscle of the placebo group following the same training and diet protocol. After eight weeks, the PA group put on 5.3 pounds of muscle and even increased their one-rep max leg press strength by an impressive 60 percent! During the course of the study, participants consumed a diet consisting of 25 percent protein, 50 percent carbohydrates and 25 percent fat, with the experimental group receiving a daily 750-milligram dose of soy-derived PA, while the placebo group consumed 750 milligrams of rice flour. Consistent with previous research, the study authors concluded that oral supplementation of

PA resulted in a significant increase in mTOR signaling—the key to regulating cellular growth. In fact, in a separate phase of the same study, pre-clinical research showed that PA increased mTOR signaling by over six times, compared to baseline.

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2014: YEAR IN REVIEW

CUTTING-EDGE TRAINING TECHNIQUES THAT MAXIMIZE MUSCLE MASS



"HIGHER VOLUME TRAINING MORE SPECIFICALLY AMPLIFIES MUSCLE GROWTH— IN LARGE PART BY INCREASING MUSCLE TIME UNDER TENSION, WHICH INCREASES METABOLIC STRESS, ENCOURAGING MUSCLE HYPERTROPHY."

While there are many training techniques that promote muscle growth, here are a few very unique, and somewhat unorthodox, training methods highlighted by Muscular Development in 2014 that potentially improve muscle growth. These cutting-edge approaches effectively increase mechanical tension on the muscle cell, increase metabolic stress within the muscle cell, or potentially stimulate the production of anabolic hormones that drive the hypertrophic process— triggering considerable gains in muscle mass.

BONE UP ON MUSCLE MASS

Bones are in a constant remodeling process involving the breakdown or buildup of bone tissue. This process of remodeling is regulated by a variety of factors, including the physical stress associated with weight training that stimulates an increase in bone tissue.

While most dismiss the positive influence of weight-bearing exercise on bone density as a benefit exclusively for the elderly, it is also extremely useful for younger individuals, especially considering the abundance of research indicating that increased bone density actually encourages greater muscle size. This effect comes from the ability of the skeleton-derived hormone osteocalcin, which is produced by bone tissue in response to weight training^{1,2}, to stimulate production of the muscle-building hormones testosterone and insulin³, ultimately supporting greater muscle growth.

TRAINING APPROACHES FOR ENHANCED BONE DENSITY

Two training characteristics have been shown

to most effectively increase bone density.⁴ The first exercise feature is the rate at which strain or force is put on the bone, meaning that exercises that rapidly generate strain or force cause the most positive influence on bone density. A typical example of this type of exercise includes jumping or plyometric training, where the rate of impact is very high. The second feature is the magnitude of the exercise-related forces put on the bone, where greater forces stimulate greater bone formation. The best example of this training approach would be high-intensity weight training. Taken together, the use of either ballistic or high-intensity training methods should trigger the greatest increase in bone density, providing a superior foundation for enhanced muscle mass.

THE ANABOLIC INFLUENCE OF WHOLE-BODY VIBRATION (WBV) TRAINING

Another relatively new training technique covered in the pages of MD during 2014, known as whole-body vibration (WBV) training, has also

been shown to effectively promote muscle growth. WBV is a training method that utilizes a low-intensity vibration, typically in the vertical direction, as an added stimulus for greater gains in lean body mass and strength. The added stimulus comes from the ability of WBV to trigger muscular contraction by stimulating the muscle cells' stretch reflex. The stretch reflex is usually activated when the muscle is quickly stretched or overstretched. The stretching triggers a reflex contraction to prevent further stretching that could cause muscle damage. WBV activates the stretch reflex by lengthening the muscle cell, which the muscle cell interprets as stretching.

HOW TO USE WBV TRAINING

The most prevalent mode of WBV training entails standing on a vibrating platform that vibrates at 25 to 80 hertz (vibrations per second) while doing lower body movements such as the squat or lunge with or without added weight. Each set lasts approximately one minute per set, with a total work time between 15 and 30 minutes. For every vibration cycle, the muscle contracts— meaning that a frequency range of 25 to 80 hertz makes the targeted muscles contract and relax 25 to 80 times per second, which certainly represents a considerable amount of added stimulus to the working muscle groups.

WBV BOOSTS MUSCLE MASS

As previously mentioned, this form of training increases muscle mass by intensifying muscular contraction through the stretch reflex. The increased contraction intensity associated with WBV training tends to stimulate a greater number of fast-twitch muscle fibers, as fast-twitch fibers are preferentially recruited during intense muscular contraction. Consequently, because fast-twitch fibers

have the greatest potential for muscle growth, combining WBV training with resistance exercise should lead to greater levels of muscle mass. In addition, WBV training also stimulates anabolic hormone production, further enhancing muscle mass.⁵ Finally, studies indicate that combining WBV with standard resistance further increases the intensity of muscular contraction for even greater levels of muscle growth.⁶

HIGH-VOLUME TRAINING FOR MUSCLE MASS

The dominant theory within bodybuilding and powerlifting circles accurately asserts that optimal strength is achieved by high-intensity training requiring the use of heavy weights within a low repetition range, while the best hypertrophic response is stimulated by the use of moderate weights at a higher volume involving an elevated repetition range.⁷ Heavier weights augment strength principally by inducing greater neuromuscular activation of fast-twitch muscle fibers, which contract more quickly than slow-twitch muscle fibers, producing more power. The increased activation of fast-twitch muscle fibers from high-intensity training ultimately leads to greater strength gains. On the other hand, higher volume training more specifically amplifies muscle growth—in large part by increasing muscle time under tension, which increases metabolic stress, encouraging muscle hypertrophy.

Several studies highlight the differences between high-intensity and higher volume training, pointing out that training prescriptions for hypertrophy differ considerably from those that preferentially boost strength.⁸ In fact, as a proof of principle, most powerlifters perform high-intensity training using 85 percent to 95 percent of their one-repetition maximum for three to five repetitions, while most bodybuilders utilize lighter weights in the 75 percent to 85 percent range of their one-repetition maximum, usually for 8 to 12 repetitions.

COMBINING HIGH-INTENSITY AND HIGH-VOLUME TRAINING FOR MAXIMUM STRENGTH AND MASS

So, it's pretty clear that high intensity is superior for strength while high volume more potently elicits muscle growth. Yet, what happens when you combine high intensity with high volume in the same workout? Could this combined training approach simultaneously boost gains in muscle strength and size? For instance, let's say the typical muscle-building workout included moderate-intensity training for four sets at 10 repetitions per set, equaling 40 total repetitions. Could one acquire both strength and size more effectively by performing higher intensity training at five repetitions, but doing eight sets to match the hypertrophic training volume range of 40 total repetitions?

A study by Schoenfeld et al.⁹ investigated whether combining high-intensity training with high-volume training could successfully bolster gains in both strength and size. The results of this study clearly demonstrate that combining high-intensity with high-volume training provides ample mechanical tension for muscle growth, along with sufficient neuromuscular stimulation of fast-twitch muscle fibers for strength improvement. So, if you're looking to simultaneously increase strength and size, additional high-intensity sets that promote strength will be required to reach training volume that also triggers considerable gains in muscle mass.



For most of Michael Rudolph's career he has been engrossed in the exercise world as either an athlete (he played college football at Hofstra University), personal trainer or as a Research Scientist (he earned a B.Sc. in Exercise Science at Hofstra University and a Ph.D. in Biochemistry and Molecular Biology from Stony Brook University). After earning his Ph.D., Michael investigated the molecular biology of exercise as a fellow at Harvard Medical School and Columbia University for over eight years. That research contributed seminally to understanding the function of the incredibly important cellular energy sensor AMPK—leading to numerous publications in peer-reviewed journals including the journal *Nature*. Michael is currently a scientist working at the New York Structural Biology Center doing contract work for the Department of Defense on a project involving national security.

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ANABOLIC RESEARCH *UPDATE AND Q&A*

BY WILLIAM LLEWELLYN



FEW REGRETS FOR EX-STEROID USERS

Life is full of choices. Sometimes we make good decisions. Other times, we don't. Time usually provides us the necessary perspective to evaluate our actions or inactions. What if we had done things differently? Do we really wish we had? We all hope to grow old and die free of regret, but alas; very few of us are actually lucky enough to make it through life without a few, at least. Doctors working at the Urology of Indiana center recently asked a very good question to a group of former steroid users, which I believe should be of interest to **anyone concerned with the subject.**¹ How likely were they to regret their earlier decision to take steroids? Is it one of those things in life that many people look back on and wish they did differently? The answer may be surprising.

First though, let's examine the group being asked. The study involved distributing a basic questionnaire to 382 men that were at the center receiving treatment for hypogonadism (low testosterone). This is, of course, a common issue with former steroid users. The men were an average age of 40. They were all asked to anonymously report if they regretted or did not regret their non-medical use of anabolic steroids, and if so, why. A total of 79 men filled out the survey. Of these, 15.2 percent expressed regret over the decision. The primary reason cited was infertility, a risk which they did not fully understand at the time they made the decision to use the drugs. The remaining 84.8 percent of respondents expressed no regret, even in spite of the possible association with their earlier use and current medical condition. Between 13 percent and 16 percent of the men had current fertility issues, a likelihood that was similar between men that did and did not regret anabolic-androgenic steroid (AAS) use.

Drug abuse is one of those areas where you expect to see a lot of regret from ex-users. Though hard for me to gain statistics on it, regret seems extremely prominent among former cocaine and heroin addicts, for example. In a recent study of smokers in four countries, approximately 90 percent regretted the decision to start smoking as well.² You don't get a much stronger regret percentage than that. The closest regret numbers I could find to the steroid survey were the likelihood of ever regretting a tattoo (14%), and the likelihood among 15- to 18-year-olds of ever having sex while drunk and later regretting it (17%).^{3,4}

Anabolic steroid use likely has a low to modest level of self-reported regret, based on the fact that long-term serious health consequences, at least those tangible to the individual, are low to modest. This is, of course, not meant to suggest that anabolic steroid use is without potential harm. Even in this study, the men commonly reported issues such as increased aggression, mood disorders, erectile dysfunction, acne, fluid retention and dyslipidemia. These occurrences, however, were not associated (at least not significantly) with regret.

NEW INVISIBLE TESTOSTERONE!

Testosterone is one of the more difficult anabolic/androgenic steroids for doping authorities to catch athletes using. This is because the hormone is found naturally in all of our bodies. It is not out of place, like say, Dianabol (methandrostenolone) would be. Even small amounts of this drug's metabolites in your urine will flag you for cheating.

Due to its natural occurrence, testosterone-doping tests are forced to take a two-phased approach. First, the ratio of testosterone to epitestosterone metabolites is measured. These two steroids are normally found in a 1:1 concentration. When significantly more testosterone than epitest is identified, the sample is flagged, but only for a follow-up test. This is because sometimes these ratios are naturally disturbed. This second test examines the molecular structure of the testosterone itself, for something called the carbon isotope ratio. Long story short, this can tell if the hormone was synthetically manufactured from a plant-based source, as testosterone normally is. The test has worked well enough for years, but there now appears to be a wrench in it! Scientists at the Australian Sports Drug Testing Laboratory recently analyzed 283 testosterone preparations that were seized by law enforcement both locally and internationally.⁵ They were looking to see if, and what portion of, these drugs would be identified as synthetic when directly analyzed with the now-standard carbon isotope ratio test. Most of the samples (270) were immediately identified as containing synthetic forms of testosterone. What might not have been expected, however, was the small percentage (4.6%) that appeared to contain natural testosterone. Instead of the normal plant-based starting materials, the steroid materials in these 13 samples must have been synthesized using an animal source.

The result of the Australian testing is alarming to doping authorities, as it suggests that athletes could use this new form of testosterone without fear of a positive analytical finding. Just when they believed they were making progress with anabolic steroids, especially the confounding designer steroid issue, another gaping hole opens right up in the program. I'll be curious to see how this is addressed. Stay tuned.

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Got a question for William Llewellyn? You can ask him directly on the MD website and have William personally answer your question! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for William Llewellyn.

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TESTOSTERONE ACETATE?

My source has testosterone acetate. I think the company was ATD China; it had a green label and came in 70 mg/ml and in a 10 ml vial. Is this a real product? What do you think of testosterone acetate in general?

This product is most likely not a real pharmaceutical, in the sense that a registered and licensed drug company made it for sale through legitimate pharmacies. China is admittedly a hard country for an English-speaking/reading person like me to keep tabs on, though. It is always possible this was really approved for sale by the government. However, I strongly doubt it.

Testosterone acetate is a real steroid, though. It is found very rarely, usually in blended products. The old Mexican veterinary preparation Deposterona comes to mind. That contained the acetate, valerate and undecanoate esters of testosterone. How unusual is that!? The total concentration was only 60 mg/ml, however, so it was not very popular. I have never seen testosterone acetate in a stand-alone product. Also, being in a 10 ml vial is highly suspicious. Most other countries (not all, but most) would require a product like this to come in single-use ampules, which keep the solution sterile.

What do I think of testosterone acetate? Acetate is the smallest ester that can be used to make an injectable testosterone. Once cleaved, this short-chain carboxylic acid can be highly irritating to the tissues at the site of injection—very painful in some cases. The acetate ester also slows the release of testosterone only slightly. Its pharmacokinetics isn't all that much better than straight testosterone suspension, which also happens to be less painful for many people.

Testosterone acetate was first described many decades ago, when injectable androgens were first being developed. This steroid went away from clinical practice fairly quickly, and

probably for good reason. It was replaced by agents that were more comfortable, slower acting, had higher oil solubility, were more concentrated and offered greater therapeutic potential. In short, testosterone acetate would “work” like any testosterone drug because it provides testosterone. But all in all, it is not desirable unless you wanted a fast-acting and possibly very irritating drug for some reason.

VERY PAINFUL T400

My friend and I each bought a bottle of Test 400 from ISIS. This is a 400 mg/ml testosterone enanthate and decanoate blend. Within 24 hours of injecting 1 ml each, we were both in an enormous amount of pain. We were sore and each had a lump in our muscles for almost a week. The whole area was red and swollen. I stopped injecting it after that. My friend tried one more time with half the dosage but had a similar reaction. Then he stopped. Is this normal? Is the product bad? I assume it is underground, but others have used from this lab without problems. I'm not sure of this product, though.

Yes, this is an underground product. Normally, I don't follow the individual labs. There are just too many, and things change too quickly. Plus, they sometimes even counterfeit each other. My advice about particular underground products is always the same: avoid all underground drugs if you can. When there is no oversight, there are much greater risks with sterility and purity, generally speaking.

This particular product did come to my attention very recently, however. It appeared in a U.K. clinic's warning email. Health care workers there have been getting many complaints from users. They are all noticing the same thing, a high level of injection-site discomfort. No explanation as to what is causing it yet. Some possibilities include adulterants, poor quality and unsterile materials, or even excess benzyl alcohol, which is sometimes used to help the high concentrations dissolve. You did the right thing. Drop something if it is causing you an issue. No cycle is worth risking permanent harm to your body. ■

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Q: FOR SOMEONE WHO WANTED TO TAKE THIS FALL AND WINTER TO PACK ON AS MUCH MASS AS POSSIBLE, DO YOU THINK IT WOULD MAKE SENSE TO DO A VERY SIMPLIFIED ROUTINE THAT WAS MADE UP ENTIRELY OF BASIC MOVEMENTS LIKE SQUATS, BENCH PRESSES, DEADLIFTS, BARBELL ROWS, MILITARY PRESSES, AND WEIGHTED CHIN-UPS AND DIPS? OR DO YOU THINK THEY SHOULD ALSO INCLUDE ISOLATION MOVEMENTS TOO?

VICTOR MARTINEZ

You should spend your time and energy over the next few months on compound movements, because those are what will build mass. Take chest, for example. Don't worry about the pec deck, cable crossovers or dumbbell flies. Instead, do bench presses, incline presses, decline presses and dips—not all of those at every workout, but you get what I mean. Do military presses, dumbbell presses and upright rows for shoulders. Your back workouts should be deadlifts, chins with different grips, barbell rows, dumbbell rows and T-bar rows. Leg day should be all about squats, leg presses, hack squats and stiff-leg deadlifts. You should add in a few sets of lying leg curls because most guys do need more hamstrings.

I wouldn't even bother with arm work unless your arms are a real weak point. In that case, stick with barbell curls and skull-crushers. But generally speaking, you shouldn't go near the cables in your gym until spring, and the only time you should use machines is for a couple of leg movements like I said. Everything else should be barbells and dumbbells. Your work sets for upper body should be for 8-10 reps, and your lower body should range from 8-15. Try to get stronger in all the lifts, but keep those reps. One really good thing about this is that when you do go back and add in the isolation movements again, it will be a shock to your muscles and you'll get another little burst of growth.

JUAN MOREL

For the purposes of putting on as much mass in the shortest time possible, I think your best bet is to focus on all those basic, compound movements. You really don't need the isolation exercises, because things like your arms and calves will still be getting a ton of indirect work. One thing I would add to this is that I don't believe working with low reps is going to do much except build your strength. Muscles need more reps to stimulate growth, so forget about three to six reps. I would do all my sets in the 8-12 range, maybe even 8-15. There's this idea that anything more than 12 reps is too much for making gains. Personally, I have found that's just not true.

"Your best bet is to focus on all those basic, compound movements. You really don't need the isolation exercises, because things like your arms and calves will still be getting a ton of indirect work."

—Juan Morel

EVAN CENTOPANI

I don't think you necessarily need to use only the basic movements, but I would certainly put a greater emphasis on them. For example, maybe you typically only do squats or deadlifts every other week or even less often. I would do them every week. Or, if you do machine rows instead of barbell or dumbbell rows at times, I would only do the free-weight versions during this phase. But more than changing the actual exercises, I would look into changing how you perform them. Traditionally, many people assume that the most effective way to gain mass in the off-season is to do lower volume and lower reps. That might be a good idea if you've been using higher reps and more volume. If you haven't, you could very well make some good gains by upping your reps and volume for a couple of months. If you normally use a lot of intensity techniques like forced reps, rest-pause and drop sets, this might be a good time to focus more on straight sets. But conversely, those techniques could be beneficial to you for the next few months if you haven't been using them, and thus your body isn't used to them.

A lot of bodybuilders tend to "save" the types of intensity techniques I've mentioned for their pre-contest training. If you think about it, the off-season would be a time when they would be better suited. You're eating more calories, more carbs and doing less cardio. That means you have more fuel and energy available for recovery. Recovery is really the name of the game when you are trying to grow. Stimulate the muscle to the best of your ability, then feed it and let it rest. As far as rest days, you might want to take more of those if you feel you need them. It's all an individual matter. You need to get in tune with your body and pay attention to how you feel when you train x days a week versus y days.



STEVE KUCLO

Let's make a distinction. If a person is fairly new to training and doesn't have any areas of his physique yet that you could identify as weak points, it would be fine to just focus on basic compound movements for a few months. But if someone has been training for a few years and has identified areas that definitely lag behind and thus need extra attention, I would be more inclined to keep isolation movements in the routine. For example, someone might have a weak side or rear delts. Obviously your shoulders are involved in the overhead presses as well as several other basics, but the carryover toward the specific areas that need to grow may be inadequate. In that case, I would keep lateral movements to the side and to the rear in the workouts. Or, suppose a guy has really bad calves. It would be silly to have him blast away on squats and deadlifts for a few months and add more size to his quads and hams, without ever doing a single calf raise. His calves are only going to appear worse in comparison by the end of this theoretical off-season. So you could do mostly compound movements, but don't stop doing specific targeted work for areas that truly need it.

One thing I would also suggest is to increase the training volume, but increase your calories and add in an extra rest day or two. Let the training work to stimulate the gains, then feed the body well and give it plenty of rest to recover and grow.



TAKING SETS TO FAILURE *When Too Much Is Enough*

Q: I HAVE ALWAYS HEARD DIFFERING OPINIONS ABOUT HOW MANY OF YOUR SETS YOU SHOULD TAKE TO FAILURE IN YOUR WORKOUTS. SOME PEOPLE SAY EVERY SET SHOULD BE TO FAILURE, OTHERS SAY ONLY THE LAST SET OF AN EXERCISE, AND SOME EVEN SAY YOU SHOULD ALWAYS HOLD BACK JUST A LITTLE BIT FROM EVER GOING TO TOTAL FAILURE. FOR SOMEONE LIKE MYSELF STILL REALLY IN NEED OF A LOT MORE MASS, WHAT DO YOU RECOMMEND?

EVAN CENTOPANI

I know most people want to hear a definitive answer that would apply to everyone, but that's not realistic since we are all slightly different. Dorian Yates has said that early on in his Mr. Olympia reign, he found that even two sets of an exercise to failure wasn't optimal, and he saw better gains once he cut it back to just one all-out set. The problem with doing just one set to failure is that you really need to make sure you put out 100 percent on that one set, because you won't get a second chance. I think everyone would need to experiment with that for themselves. Some bodybuilders do take all their work sets to failure and see good results that way. Others never go to complete failure, yet they grow that way. So I think it makes sense to give both extremes a try, as well as something in between. It all comes down to recovery. Some people are able to recover faster and more completely, and for them it absolutely would be wise to take more sets to failure. If you can recover that well, you would make better gains by doing more sets to failure versus less, since you would be stimulating more growth in the workout.



VICTOR MARTINEZ

I don't believe in taking all sets to failure at all, and that was something I learned in the three years I did powerlifting when I was younger. Let's say your one-rep max on the bench press is 405 pounds. You start warming up with 135, but you can't go to failure. If you did, you would do 100 reps and be too pumped to go as heavy as possible in the sets that followed. You also need to respect your nervous system. You can't take every set you do to failure, or you will burn it out. Good luck making gains if you do that! You'll be badly overtrained. Taking all sets to failure doesn't give you the best workout—it takes away from it as far as I'm concerned. I like to do my sets increasing the weight and decreasing the reps, as in 20, 15, 10-12, 10-12. Only the last two sets, or maybe only the last one, are to failure. It's worked very well for me over the years.

JUAN MOREL

Moderation usually seems to be the best answer to most questions. If you take all your sets to failure, you will fry your nervous system and use up so much energy that you won't be able to finish your workouts. On the other hand, if you don't do any sets to failure, your muscles never get the intense stimulation they need to force a growth response. So for me, it depends on how many work sets of an exercise I am doing. If it's something like squats where I might be doing five work sets, the last two or three will be all-out. If it's something I'm only going to do three sets of, the first two will be a couple of reps shy of failure and just the very last one is the set I will push 100 percent on. You also have to remember that I believe in training with a higher volume in general, too. I have to hold back on a lot of the sets I do or else I would have to cut my workouts short, and longer workouts give me the best results. You have to listen to your own body and use your best judgment.

STEVE KUCLO

Going to failure on all of your sets **is not** the ideal situation, in my opinion. I believe it makes more **sense** to save going to full failure until the last set or two of an **exercise**. You only have so much energy to work with at any given **workout**. If you blow your wad by going 100 percent on the first **work sets**, where does that leave you for the sets that follow it? You've heard that you can work hard or you can work long, but you can't do **both**? What that means is that if you are truly putting out 100 percent **intensity**, you're not going to be able to do much after that.

I prefer to increase the weight and **increase** the intensity as the set goes on, so you build up to the **final** all-out set with the heaviest weight. To me it's like the concept of warming up, only you apply it to work sets. Make each set **progressively** more difficult until the last one is definitely the **toughest**.

I disagree with never taking any **sets** to failure. If you never push past your boundaries, your **body will** not have any reason to adapt. You do need to hit that new **level** you've never hit before if you want your body to continue growing. I don't personally know any bodybuilder that never takes **sets** to failure.

"If you blow your wad by going 100 percent on the first work sets, where does that leave you for the sets that follow it?"

BODYBUILDING ON A BUDGET

Big Gains with Little Cash

Q: IF YOU WERE COACHING A YOUNG BODYBUILDER ON A VERY TIGHT BUDGET, WHO COULD ONLY SPEND A VERY LIMITED AMOUNT OF MONEY ON SUPPLEMENTS AFTER BUYING HIS GROCERIES, WHICH TYPES OF SUPPLEMENTS WOULD YOU ADVISE HIM TO INVEST IN?

EVAN CENTOPANI

This is a tough question, because I **know my** answer isn't what a lot of the MD readers want to hear. I would **want to instill** the importance of health and prevention, and emphasize the **optimal functioning** of the body before adding in products that are **designed to enhance** performance, like a pre-workout formula. My primary concerns are **digestive health** as well as things that serve to improve the health of the **liver and all the other organs**. If those aren't **functioning properly**, your **body won't ever perform** to the best of its capacity, regardless of how many **performance-enhancing** products you use— and that includes steroids as well.

First, I would want to see a **person taking a quality** multivitamin and mineral, an antioxidant formula, and **the reduced form of CoQ₁₀** called ubiquinol. It's best to instill these habits in **a person when they're** first starting out. When I was in high school, I worked at a **GNC**. People would return products, which meant I could try them out for **free**, and **we often** had things on sale. So I tried a very wide array of **supplements designed to do** many different things. It took me years to realize that I actually **felt the most tangible** benefits from the vitamins and minerals. I felt better, **healthier**, and **that** definitely carried over into how I performed in the gym and **the results I experienced**. It's not the fancy or glamorous supplements that I've **ever felt did** the most for me.

If this theoretical young bodybuilder **does have** some money left over and wants to invest in something else, I would **lean toward** recommending a generic carbohydrate and **amino drink to have during** and/or after workouts. It's very basic, but it's tried and true **for enhancing** recuperation. You could get bulk EAAs (essential amino acids) and **dextrose pretty** cheap. Recovery really is an aspect I don't feel most bodybuilders **pay enough** attention to. A huge part of why anabolics work so well is the **fact that they** enhance recovery so well, so anything else we **can do as bodybuilders to do** the same thing with our rest and our supplements should also **be taken** advantage of.



STEVE KUCLO

The very first product I would look into would be a good amino acid blend, like a BCAA powder. Using those before, during and after training will make a real difference in the results you see from your training. They just ensure that your muscles have the raw building blocks they need, since training will deplete those. Even though the young guy is supposedly all set with food, I still think it's a good idea to also pick up some whey protein isolate. You are always going to run into situations where you can't eat a meal when you thought you would, or you can't break out a meal and eat it for whatever reason. In cases like that, a protein shake is a real lifesaver. They can hold you over until you are able to eat solid food, and make sure you don't go into a catabolic state.



JUAN MOREL

I've said it before and I will say it again. I am not a huge believer in supplements. Food is the most anabolic substance you can put in your body. I would much rather see someone spend more money on food than supplements. But if you have all the food you need and you do have a little extra left over for supplements, there are a few basics you could use. One is whey protein, which is really just a powdered version of food anyway that you mix up and drink. Whey protein shakes can help you reach your protein goals for the day if you aren't able to sit down and eat all the protein you need in the form of solid food. Creatine is a supplement that's been around for more than 20 years now, and tons of people around the world have seen good results with it. Creatine does help you train a little longer and harder, and gets more water into your muscle cells. The last one I would buy would be a pre-workout. I don't need a boost to train normally, but when I'm dieting for a contest and my energy levels start to drop, a pre-workout drink helps out a lot. It could also be good for someone who has a physically demanding job and does need that little extra kick before they hit the gym. Just be careful not to take them too close to bedtime or you could wind up awake all night!

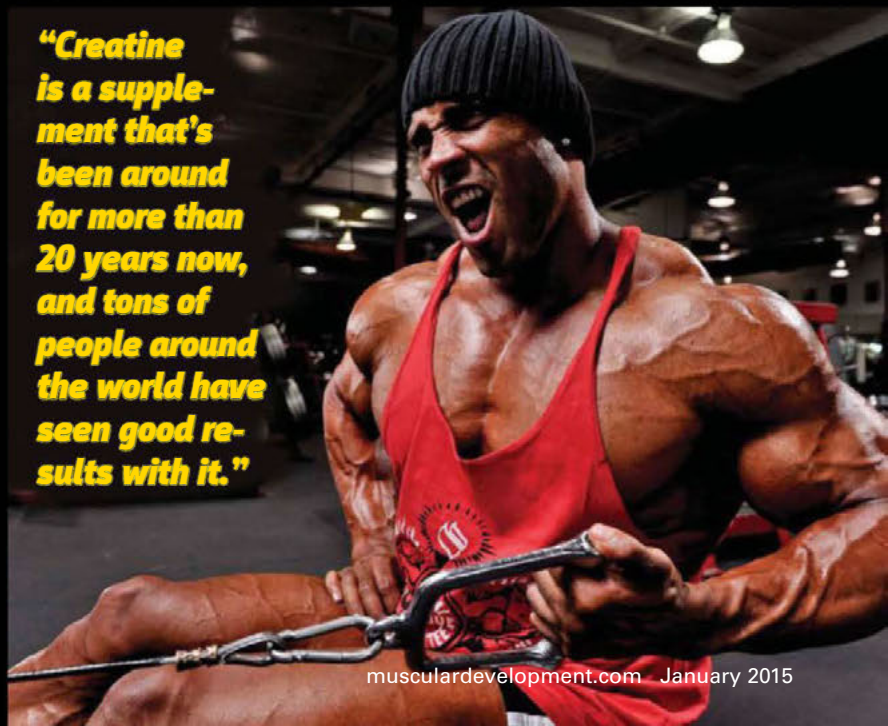
VICTOR MARTINEZ

First of all, I would do what I did when I was young, which is get a job at a restaurant! You will either get free meals or a very good discount, so it's an easy way to save a couple of hundred bucks a month on your food bill. I am guessing this kid has about 100 bucks a month to spend on supplements. That money should go toward protein and carbs. A good whey protein product, some BCAA powder and a carb powder will let you get a couple of protein shakes a day, plus a good shake to have after all your workouts.

One thing I would forget all about for a young guy is anything that is supposed to boost your testosterone. At this time in his life, his body is pumping out a ton of that shit for free! There are other supplements that you might look into that I consider the "icing on the cake," like nitric oxide boosters and pre-workouts. But if you don't have the cash for a pre-workout, a strong cup of coffee will get the job done too.

One last tip so you can save money on food is to forget about buying only organic or eating gluten-free. Eating that way will cost you literally twice as much money, and I for one don't feel there is any real benefit. A lot of people who do eat that way have a lot of money, so it's not a problem. For a young bodybuilder on a budget, you're going to be struggling to have enough cash to eat if you insist on going organic and/or gluten-free. So don't!

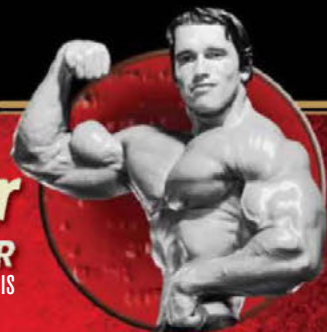
"Creatine is a supplement that's been around for more than 20 years now, and tons of people around the world have seen good results with it."



Arnold's Corner

WITH 7-TIME MR. OLYMPIA ARNOLD SCHWARZENEGGER

BY RON HARRIS



Do You Have What It Takes TO BE A CHAMPION BODYBUILDER?

That's a question millions of young men have asked themselves over the years, and arriving at a definitive answer isn't easy. In his best-selling book *Arnold's Bodybuilding For Men*, by Arnold Schwarzenegger with Bill Dobbins (c) 1981 Simon & Schuster, Arnold seeks to help novices determine their potential for the sport in the chapter, "Part VIII Competition Bodybuilding — Taking the Next Step." Right up front, Schwarzenegger explains that not everybody has the raw potential to develop an exceptional physique:



"One reason why certain people get interested in bodybuilding is simply because they are good at it. They start training with weights and suddenly their bodies begin to respond and develop rapidly. Not everybody has this physical capacity, just as not everyone can run a 9.1 hundred-yard dash or run a sub four-minute mile, no matter how much or how hard he trains. If everyone who ever wanted to be a champion bodybuilder could achieve that goal, we'd have champions coming out of our ears. Obviously, since we don't, not everyone has the potential to succeed in competition bodybuilding."

He goes on to say that bodybuilding potential is often far from apparent in some people. It's not until weight training is undertaken that those who were meant to rise to the highest ranks begin to exhibit clear signs they aren't

like the rest of the minions slogging away in gyms around the world:

"My friend Franco Columbu, himself a Mr. Universe and a Mr. Olympia, is a good example. When he first came into the gym he was a 130-pound boxer who had no real interest in hardcore bodybuilding. But within a few weeks he discovered he had a talent for lifting enormous amounts of weight, and he began to train harder. Within a few years Franco was recognized as, pound for pound, one of the strongest men in the world, and his body had developed to the point where he has won a place for himself as one of the top bodybuilders of all time."

Next, Arnold makes a point that I have noted firsthand in my own 20-plus years working in bodybuilding media. Over that time, I have witnessed legions who possessed the gifted genetic attributes in terms of structure, muscle shape, and that unnatural ability to grow to extreme size, yet lacked the other key components—the heart and the head to be a champion:

"You need dedication, and you have to be prepared to make sacrifices. I have seen that even those people who find they have the physical talent it takes to be a bodybuilder sometimes won't have the attributes of character and personality that allow them to persevere in this difficult undertaking."

Before dashing the hopes of his readers, Arnold is quick to offer some encouragement. Some of the greatest bodybuilders of all time didn't seem to be destined for fame or prestige at the outset of their careers. You have your genetic gods, and you also have some who rose to greatness by training harder and smarter than the rest of the pack.

"Assessing potential in bodybuilding is more difficult than in practically any other sport. For example, when I first saw pictures of Frank Zane years ago I could never have believed he would develop into the champion that he is today. And when Franco Columbu first came into the gym, nobody thought he had a chance to succeed as a bodybuilder. His arms, legs and torso were too short; his

proportions seemed totally unsuited to developing into an aesthetically outstanding physique."

Arnold wants to make it perfectly clear that some of us are so blessed physically that the only factor missing to assure greatness is the right mental approach. For the rest of us, building an exceptional physique is not a sure thing, but instead a gamble.

"If you look in the mirror and see wide shoulders, a narrow waist, long arms and legs, and you have the mental dedication and motivation to train harder than anyone else, then the odds shift more in your favor. If you're someone like Franco with short arms, legs, and torso, the risk you are taking in spending five years or more training for competition is that much greater. You have to decide if it's worth it."

Arnold's sagest advice is that regardless of your potential for bodybuilding, it would be foolish to put all your eggs in one basket, pinning all your hopes and dreams on the goal of winning major contests and making a great living off your muscular body. Even Arnold himself, who had what many still consider the perfect physique and who ruled the sport for years, didn't allow his life to be that narrow in scope.

"Meanwhile, I recommend that you continue to develop the rest of your life as well. Don't give up on your education, for instance. All during my own career, even while I was winning (my first) six Mr. Olympia titles, I continued to take college courses toward earning a university degree. Believe me, this effort has allowed me to take much greater advantage of the opportunities that being a champion opened up for me."

Some of you were born with spectacular genetics for bodybuilding. If you were, you probably already know because you would have developed a pretty impressive physique in a fairly short span of time training. If not, don't give up hope just yet. If you consistently work hard in the gym and with your nutrition and supplementation for years, you can still manage to build a physique that most average people will be in awe of, and that will probably be good enough to succeed in competitions at the local and regional level. And if that's as far as competition takes you, so be it. As Arnold proved with his own story, there is far more to life and many other paths to success and fulfillment far beyond the contest stage!

The Animal Kingdom WITH 8-TIME MR. OLYMPIA LEE HANEY



SPORTSMANSHIP

I felt the need to address this subject after attending the 2014 Mr. Olympia contest, where I witnessed displays of non sportsmanship-conduct both before and during the competition.

In my day, we also had rivalries with each other, of course. It's not a team sport, and only one man was going to be awarded first place at the end of the night. But we still had a brotherly love and mutual respect for each other. You never saw us trash-talking each other or worse, pushing and shoving each other onstage! That's just not cool, and I don't feel it makes our sport any more "exciting." It just looks unprofessional. Each athlete prepares to the best of his ability, and then takes the stage

made me improve. As a result, nobody ever beat me again after that season.

And Mohamed never held any grudge toward me either. In fact, I caught up with him in Canada a few years ago, and it was just like old times. We talked about the old days, our families, our businesses, and how the sport was so good to us and gave us those opportunities that we seized once our days on the stage came to an end. You see, that's what it's all about. As athletes, we are only going to be competitors for so long. It's what we do in that time, and how we carry and present ourselves, that will have an impact on our lives and careers after we retire. You never want to do any

before the awards were even finished. It was very uncomfortable for all who were there. NPC judges, promoters and state chairmen are all people with feelings and opinions. You can bet they will never forget that man's embarrassing display of negative emotion and immaturity.

Your physique is only part of who you are as a bodybuilder. Your actions and demeanor factor in as well. It's not so different from professional leagues like the NFL or the NBA. The actions of the players off the field matter, and they are disciplined, fined or even released from their teams in some cases when offenses are serious.

As a pro bodybuilder, competing is just a small part of your income. Most earn more from sponsorships and appearances. Sponsors will definitely think twice about having anybody represent their company who has a bad image, and you can be sure promoters won't want to bring them out to their events in the USA or abroad. You need to market yourself and project positivity. That's what Tom Platz did. He never won the Mr. Olympia, or a single pro show for that matter, but the fans of his era couldn't get enough of him. Tom did more appearances around the USA and Europe than anyone else he competed with, bar none. Yes, he had those tremendous legs, but it was more his personality, passion for what he did, and his sincerity that made him in such high demand.

So my best advice to all the competitors out there is to carry yourselves as professionals on and off the stage, and especially not to overreact when you don't win. Respect the judges, your fellow athletes and yourself. Take that experience and use it as motivation. Figure out what you need to work on to make sure you come out on top next time, and then get to work! ■

Would you like to train with eight-time Mr. Olympia Lee Haney? Lee offers both online and personal training for out-of-town guests. Visit www.lee-haney.com for a complete list of services!

Got a question for Lee Haney? You can ask him directly on the MD website and have Lee personally answer your question! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for Lee Haney Zone.



"YOU NEED TO BE POSITIVE AND CARRY YOURSELF WITH DIGNITY, BECAUSE PEOPLE WILL REMEMBER THOSE MOMENTS WHEN YOU DON'T."

and displays the finished product of all those weeks and months of dieting as well as he can (presentation is a critical component). Beyond that, the decisions are entirely up to the judging panel. Being rude or aggressive toward a fellow competitor isn't going to make your physique any better than his.

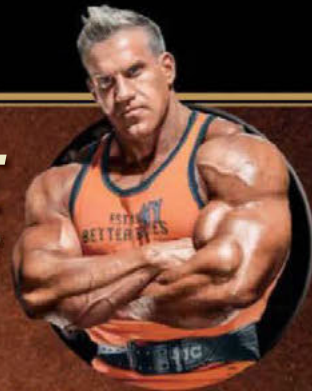
I can honestly say I never had that type of animosity toward my comrades in iron, even when they beat me. In this photo, you see me lifting up Mohamed Makkawy after he was announced the winner at the 1983 English Grand Prix, one of five times he placed above me in my rookie year as a pro. I didn't hate him for beating me! He brought out the best in me and

type of damage to your image or reputation, because then you have to work a hundred times better on damage control—which is rarely 100 percent effective anyway. You need to be positive and carry yourself with dignity, because people will remember those moments when you don't.

Case in point. I am granted the opportunity to attend many NPC events to promote my training certification and my nutritional products, and speak with many of the competitors at their athlete meetings to wish them well. At one of those contests, a young man was deeply upset with the placing he was awarded, and immediately stormed off stage in a rage

A CUT ABOVE

WITH 4-TIME MR. OLYMPIA JAY CUTLER



TRAINING TOO MUCH? GO BY HOW YOU FEEL

You mentioned in your "Jay Cutler – All Access" DVD that if you are meeting your nutritional needs, you should not really be able to become overtrained. I got great results for a long time training three times a week, but from watching most of your videos I have increased both the volume and intensity. I'm now training four to five times a week. I'm a 32-year-old natural bodybuilder/powerlifter, but my two training partners use some gear. Do you think I am OK trying to match their training, and do you think 45-60 minutes of heavy weights four to five times a week is going to burn me out? I find that my partners don't train that much heavier than me, but they do push me to take less rest time between sets, which I feel I need.

That all depends. Are you feeling good and making progress? If you are feeling run-down and overtrained, there might be a reason to train less, but otherwise you shouldn't be so worried. If your nutrition is on point and you are getting plenty of sleep, you should be able to handle the amount of work you're doing. I train up to two hours a day, five or six days a week, and there are even times where I won't take a break at all for two weeks or more. Go by how you feel. I've found that the more I train, getting that blood volume into the muscles, and the more I eat, the bigger and the rounder I get.

SET A BETTER EXAMPLE TO SQUASH THE 'PLANET FITNESS' STEREOTYPE

I hate those Planet Fitness commercials that show bodybuilders acting like complete jackasses. As an ambassador of the sport, don't they bother you too?

Many bodybuilders find those TV spots offensive and insulting. What I see is Planet Fitness poking fun at a caricature of every negative stereotype the public has about us: the first and most famous one showed a huge guy who's stupid, dressing like he's in a magazine photo shoot and all oiled up, and admiring himself in the mirror. As an ambassador for our sport, people expected me to be furious about that. But you know what? I'm not like that, and you shouldn't be upset unless you dress and act like that either.

You need to understand that if you have built any type of physique that's

better than the average guy or girl in the gym, you too are a representative for all of us. Don't dress in ways that make you look like you're desperate for attention, like string tank tops, boots and little shorts. Don't yell and scream and cuss, and drop weights. Put your weights away when you're done with them. Be courteous and respectful to everyone else in the gym, no matter who they are or what they look like. Help people out if they need it. Smile and say hello to break the ice, because a lot of people do find bodybuilders intimidating until they actually meet one and see we're just like anybody else.

If you're upset about the way bodybuilders are perceived, set a better example so that people gradually will understand that it's only a very rare few insecure types who act like idiots. Most bodybuilders are nothing like that, so it's up to us to change the way people think about us.

HEAVY SQUATS COME FROM STRONG LEGS

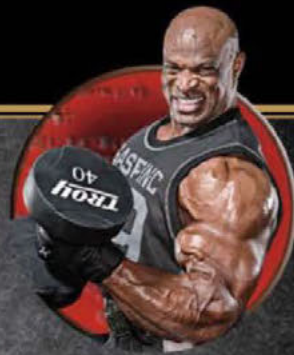
What's the most you ever squatted?

My legs were really strong when I was in my late teens, even though I hadn't been training very long. At 19, I remember squatting with close to 700 pounds for a couple of reps, and the reps were always ass to the floor. Back then my legs totally overpowered everything else. I used to squat 500 for 10 reps like it was nothing. These days I stick with 405 and do two good sets with that, doing things like pausing at the bottom to get more out of a moderate weight. Heavy squats have always made my lower back tighter than any other exercise. It should be noted that muscle size and strength aren't always closely related. We have a kid at my gym now who squats with 405 all day long. His legs are about the size of the average woman who weight trains— nothing like what you would expect. Unless you saw him doing those squats, you would never imagine he was capable of handling four plates.



Hardcore Q&A

WITH 8-TIME MR. OLYMPIA RONNIE COLEMAN



PUTTING ON MASS

Hi Ronnie. A friend of mine let me borrow a couple of your old training DVDs to motivate me, and now I really want to become a bodybuilder! The weather is cooling down and I figured the next few months would be the perfect time to try and pack on some serious size. I am 28 years old, 5'10", and 160 pounds and would love to hit 200 pounds by springtime. I've dabbled a little bit over the years with weights but have never been serious or consistent until now. Can you please give me some general guidelines for how you think I should train and eat to gain as much mass as possible? Thanks, you are the GOAT (Greatest Of All Time)!

Thanks for the kind words. What I would do is keep everything real simple. Train every body part twice every seven to eight days with mostly basic movements. Probably the best way to do that is to split the body three ways and go three days in a row, then take a day off. Warm up for every exercise, and do three or four work sets where you pyramid up in weight as the reps come down.

I've put together a good routine you can follow:

Day 1

Chin-ups	4 x 12
Barbell rows	3 x 15, 12, 10
Deadlifts	4 x 15, 12, 10, 8
Barbell curls	3 x 15, 12, 10

Day 2

Bench press	4 x 15, 12, 10, 8
Incline barbell press	3 x 15, 12, 10
Military press	3 x 15, 12, 10
Lateral raise	3 x 15, 12, 10
Skull-crushers	3x 15, 12, 10

Day 3

Squats	4 x 20, 15, 12, 10
Leg press	3 x 20, 15, 12
Lying leg curl	4 x 15, 12, 10, 10
Stiff-leg deadlift	3 x 12, 10, 8
Standing calf raises	3 x 20, 15, 12

As far as eating goes, I would try to eat six times every day. No more than two of those meals should be protein shakes. I used to have a protein shake with my grits or oatmeal in the morning, then another one right before I went to bed. For my others, I would have a protein like steak, chicken breast, or fish along with carbs like potatoes or rice. If you can have five solid meals a day and one shake, that would be perfect.

Protein is what builds muscle, so make sure you have 2 grams per pound of bodyweight divided up between those six meals. So for a 160-pound guy like you (hopefully that number goes up soon), that's 320 grams divided by 6, or 53. I never really counted carbs, but about 4 grams per pound should work pretty good, or 640 grams. That would come out to a little more than 100 grams with each meal, assuming you have some carbs like a couple pieces of fruit or some tortilla chips with your shake, too. Just try to get a little bit stronger on all your lifts as the weeks go by, and adjust your grams of protein and carbs as you gain bodyweight. Forty pounds is a whole lot of weight to gain in a few months, but considering you are still pretty much a beginner, I think you can make it happen.

CHECK OUT RONNIE'S WEBSITES

ronniecoleman.net, bigroncoleman.com, Facebook: *Ronnie Coleman*
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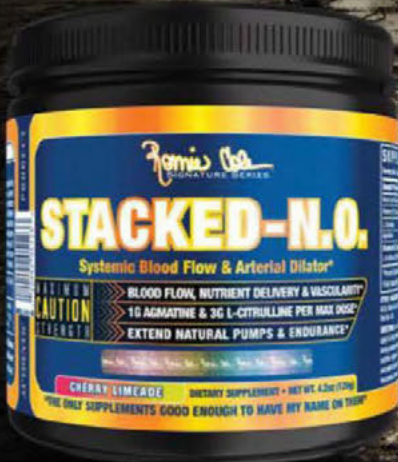
THE IMPORTANCE OF MESSAGES

In the years you competed, how often did you get chiropractic adjustments and deep-tissue massages? Did you do either or both of those more frequently once you started making much better money once you became Mr. Olympia? How valuable a role did you feel they played for you?

I went as often as I could, and in the last half of my years winning the Mr. Olympia, I was up to three adjustments and three massages every week. I started getting chiropractic adjustments back when I was in college, but it wasn't too often. Once I started competing years later, I found they were more necessary due to the way I trained. As I continued competing, there were a lot of little injuries, aches and pains, especially with my shoulders and back. Without getting those different therapies done on a regular basis, I honestly doubt I would have been able to keep going on and win eight Mr. Olympia titles. People would always tell me they wish they could be as big and strong as I was, but they don't understand what a toll it takes on your joints and your connective tissues. Nobody was really meant to be that big and strong. You're pushing your body way past its limits. It's almost like you're driving a million-dollar racecar that goes 200 miles an hour for 500 laps. That car is gonna need way more maintenance than a little Honda someone just uses to drive to work and back every day!

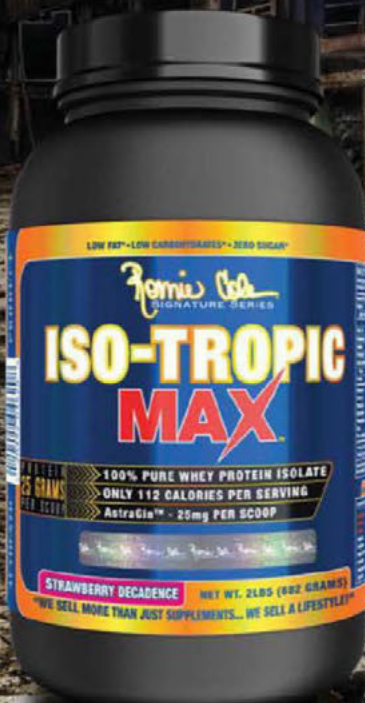
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The Blade

WITH 2008 MR. OLYMPIA DEXTER JACKSON



PUSH, PULL AND LEG WORKOUT TO BUILD MASS

Dexter, I would love to put on a good 15 pounds over this off-season. Can you give me a good training split to follow? I've heard about simplifying things by just doing days for push, pull and legs— is that a good idea?

That's a good idea, sure. It just gets tricky when you try to figure out how to structure those days. You could do all three in a row and then take a day or two off. Or, you could put a rest day after each of those. I've heard of even simpler off-season programs like what Evan has done, just days for chest, back and legs. You could do any of those, or just have a more standard four-way split like in the box below.

I don't think it really makes a huge difference. But, if you do decide to have push and pull days, I would try to keep the workouts at an hour maximum, and don't do "full" workouts with a whole list of exercises like you would if training just one body part a day. Attempting to do your normal chest, shoulder and triceps workout all in one session is too much. Pare it down to two exercises for each of those, three at most, and no more than three work sets each. You can probably get away with doing closer to your normal back and biceps workout, but I would still cut it back a bit on each. Four exercises for back, and two for biceps is plenty. Your leg day should be about the same as always. Just try to emphasize basic movements, keep your reps around 8-10 for upper body, and 10-15 for lower.

Day 1: Chest and triceps
Day 2: Back
Day 3: OFF
Day 4: Shoulders and biceps
Day 5: Legs
Day 6: OFF, repeat

WHEN TAKING TIME OFF FROM GYM, EAT CLEAN TO AVOID WEIGHT GAIN

I am going to be unable to work out for at least two to four weeks. How should I adjust my diet to keep from gaining weight and losing size?

All you need to do is account for the decrease in your activity levels. You should be eating less, and eating cleaner so you don't gain any body fat. Don't worry too much about losing size. As long as you are still eating 1.5 grams of protein per pound of bodyweight, you will barely lose any muscle. Any muscle you do happen to lose in two to four weeks will come right back in a week or two once you are able to train again.

STILL GOING HEAVY, BUT TRAINING SMARTER

Jay Cutler once said, "Ronnie ruined it for everyone." What he meant was that with all the super heavy lifts he did in his training videos, even close to contests, Ronnie gave the impression that all top bodybuilders should not only be as strong as world-class powerlifters, but that they should train as heavy as possible even in the final weeks before a show. Now, if a pro fails to meet either or both of those expectations, he is called a weakling and lazy. As someone who doesn't try to max-out with very low reps and has never suffered a training injury, what are your thoughts on that subject?

It's something that I've learned as I got older and more experienced. For about the first 10 years of my training, it was all about lifting heavy. And really, it had to be that way. You're not going to build your base of size without getting pretty strong on all the basic free-weight movements. As I got older, I had to make adjustments and change my training. I still go heavy, but I am a lot smarter about when I go heavy and on which movements. I don't need to squat 500 pounds anymore, and putting a barbell that heavy on my back at the age of 45 would not be too smart. Instead, I can load up a squat machine with plenty of resistance and stimulate my quads that way.

When it comes to training in the last couple of months leading up to a contest, safety is paramount. At that point, the goal is to retain my mass while getting rid of all the fat. You're not building muscle on a contest diet, so it doesn't make sense to try and use the same weights you do in the off-season, even if you can. I have a super fast metabolism (still), so I find I do need to keep my weights pretty heavy to keep my muscle size, density and roundness. But I'm not trying to set any records or impress anybody with the weights I use. My goal is to impress the judges with my physique on contest day. I could care less if people think I should be training heavier. It has nothing to do with me winning or losing on stage. ■

Visit Dexter's official website: dextertheblade.com.

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Got a question for Dexter Jackson? You can ask him directly on the MD website and have Dexter personally answer your question! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for Dexter Jackson.



The Gifted One

WITH 4-TIME MR. OLYMPIA PHIL HEATH

BY RON HARRIS



Do you feel that Phil Heath showed he isn't invulnerable at the recent Mr. Olympia contest, by being off his best? Or, do you feel the fact that he still held on to his title despite being about 90 percent of his best only proves that no one right now is capable of beating him, even at their absolute best?

PETER MCGOUGH – MD SENIOR EDITOR

I think Phil Heath's fourth Olympia win proved pure and simple that even at less than his best, he just has too many attributes at his disposal to be beaten by any of the current crop of Olympians. He just has so much going on, head-to-toe (we're talking unique muscle roundness, detail, thickness, shape and balance), for the other guys at this stage. Only two guys currently seem to have the potential to give Phil a run for his money in the future: Big Ramy, who it has to be said has not made the dramatic conditioning improvements he seemed to promise in 2013, and 26-year-old Justin Compton, who is a threatening WIP entity, still on an upward curve of maxing out on his potential. Back to Phil: I think there is a limit to how far from his best he can be and still prevail, as he may leave the door a little too wide open for a Greene, Wolf or Rhoden who is 100 percent on. Plus I think he owes it to himself and the fans to show everybody what a 100 percent Phil Heath (improved from his 2011 performance) can look like. My view is we will see that Heath in 2015, and that he needs to entrench his legacy.

TAKING A BITE of the HEATH BAR

RONNIE COLEMAN

I feel that right now, Phil is so far ahead of everybody else that even if he's a little bit off, it's still too much for the other guys to handle. I can't see anyone beating him for a while. I didn't see the score sheets, but I heard he got straight ones from the judges. That doesn't surprise me at all.

BOB CICHERILLO

I would say the answer is BOTH. The fact he can still win at 90 percent shows how truly gifted he is. What it also shows us is that he is human after all ... and it opens the door for someone to come in at 100 percent and break his streak, much like we saw Ronnie show a vulnerability in 2001 when Jay pushed him for all he had. Ironically, it was both Ronnie and Phil's fourth Olympia that was on the line. What the competition better hope is that it doesn't motivate Phil to be even better next year, as Phil prides himself on being better for each Olympia.

DAN SOLOMON – MD FEATURES EDITOR

In his chase of a fourth Sandow, Phil reminded us that even the great ones have moments of vulnerability. In 2013 he delivered chiseled, striated, four-dimensional perfection. But his 2014 walk across the stage revealed something a bit less dominant. He showed us that it's unrealistic to expect dominance year in and year out. His 2014 Olympia showing brought back memories of those rare moments when many of the great ones missed their mark; those nights when men named Dorian, Ronnie, Arnold and Cutler opened the door to those who pursued them. And just like those other champions, nobody was able to walk

through the door. Phil survived. And if I were a betting man, I'd lay a healthy sum that he will read words like this, and they'll provide him with all the fuel he needs to reclaim his dominance when the battle resumes in September.

JUAN MOREL

I believe anyone can be beaten, and Phil was off his best this time. He left the door open. Maybe it wasn't enough in the eyes of the judges, but I thought Kai could have taken it this last time and a lot of people would have been fine with that. This was the best I've ever seen Kai. Phil is a great champ and I have nothing but respect for him, but this time he just wasn't dominant the way he has been in the past.

CHARLES GLASS

The question here assumes that someone else on that stage this year was at his absolute best. I was sitting up front for both the judging and the finals, and nobody I saw hit it 100 percent, not even Kai. Kai was a bit off for the judging, a little watery, and some of his body parts don't match up. How do you have a peaked bicep when your arm is sticking straight out? Judges notice things like that. I think both Dennis Wolf and Shawn Rhoden would have pushed Phil harder than Kai did if they had been at their very best. I tell you this, if Phil shows up looking like that again next year, I could easily see him getting beat. He is the best right now, but even the best physique in the world can be beaten under the right circumstances. If he misses his mark next year and either Shawn or Wolf or someone else brings their all-time best, you will see a new Mr. Olympia crowned. ■

Blood & Guts

WITH 6-TIME MR. OLYMPIA DORIAN YATES



DON'T TRAIN ON AN EMPTY STOMACH

Hello Dorian. I'm a bodybuilder and training for 15 years. I always trained around 11:00 a.m., but now I will need to train when I wake up. What would you recommend to eat before training?

First off, you are probably going to have to wake up just a little earlier than you are planning on. Training on an empty stomach is a terrible idea, as your body simply won't have the fuel it needs to get through a proper workout. You can't train heavy and with any real intensity if you're starving and in a catabolic mode. What I would do since you want something you can ingest quickly and get to training as soon as possible is a shake. I would make it with whey protein like my Tempo, some quick oats, a banana and some olive or coconut oil for healthy fats. That's pretty much a complete meal, and you could commence with your workout in 45-60 minutes.

When I was an amateur, I had to train at all kinds of times to accommodate my work schedule. Once I was a pro and could train whenever I wanted to, I chose to train in the late morning. My breakfast would be at 8:30, and it was quite substantial—about 1,000 calories. Then at 10:30 I would have a protein shake with a banana, and start my workout at 11:30 or noon. I didn't need to wait as long because the shake was much lighter than any of my solid meals.

THANKS FOR THE AUTOGRAPH, SORRY ABOUT THE CONDOM

Hey Dorian. I met you at the 2009 Olympia and I bought a signed copy of Blood and Guts. When I was fumbling around for my wallet, a used condom flew out. I picked it up so fast, but I still think you might have noticed. Did you? I'm truly sorry about that. I had a crazy night the night before, and totally forgot about it. Fucking Vegas, man. I'm being totally serious, by the way.

Congratulations on being wise enough to practice safe sex—I commend you on that. But hopefully you have figured out by now that used condoms are to be properly disposed of, not put back in your

wallet. I certainly hope you're not rinsing them out and re-using them! I don't have any recollection of this incident at all, but crazy things do happen in Las Vegas. Hope you enjoyed my book!

CARB BACK-LOADING NOT A GOOD PLAN

Hi Dorian, big fan from the U.K.! I came out to Marbella, Spain and had a personal training session with you in 2012. I took your advice and decided to commit to competing in my first-ever show last year. It was only a local show, but I went on to win the first-timers and the overall title. So thanks for lighting the fire in my belly. Have you ever carb back-loaded? Basically, your entire carb intake for the day is consumed within four hours of training, before and after your workouts. Thanks again.

Congratulations on your win, and I am happy to hear that I was able to inspire you. Well done on your show—it reminds me of my first contest back in 1985. I won the novice division as well as "Physique of the Day," equal to the overall title. As for carbohydrate back-loading, I can't say I ever did that. In my off-season I took in about 1,000 grams of carbs a day, from my first meal to my last. I continued to have carbs with all meals. I never bought into the idea that you need to stop eating carbs after a certain time. Fat loss is all about expending more total calories than you take in, and I don't believe it matters very much when you eat carbs. That being said, you should have complex carbs in your pre-workout meal, simple carbs in your post-workout shake, and more complex carbs in the meal that follows. Any further carb intake should be based on your goals and with relation to your overall caloric needs. ■

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Got a question for Dorian Yates? You can ask him directly on the MD website and have Dorian personally answer your question! Go to www.musculardevelopment.com, MD Forums, No Bull, The DY Zone.



Gal Ferreira Yates
IFBB Pro

Dorian Yates
6x Mr. Olympia



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SHAKE UP YOUR THIGHS

WITH ZERCHER SQUATS

The French strongman Louis Uni, who went by the name of Apollon the Mighty, was reported in 1892 to have cleaned a 340-pound barbell (large balls on the end of the bar in those days), jerk it overhead, then let the barbell fall, and caught it across his flexed forearms before placing it on the ground. He was no small man, described as being about 6 feet 3 inches tall and weighing 265 pounds, with 18-inch forearms. That lift probably influenced another strongman, Ed Zercher, who in the 1930s developed an innovative way to hold a barbell during squats. Zercher popularized a version of the front squat holding a barbell in the crux of his flexed arms, in the same position that Apollon used at the end of his lift, and this new squat lift was named after him.

This Zercher squat has its benefits, but also its risks. The benefits are that you really don't need a huge set of weights to get a great thigh workout. In addition, with the barbell positioned in front of you, the spine has much less compressive forces, while strongly activating your hamstrings, gluteals, back, abdominals and the entire core. You can get a pretty deep squat as well, while maintaining good balance if you like to go deep. In addition, your biceps are really challenged to keep the weight in position. The downside is that it can get pretty uncomfortable to have a barbell resting across your biceps tendons at the front of your elbow joint. Nevertheless, you might want to give it a try for a really different feel for your thighs.

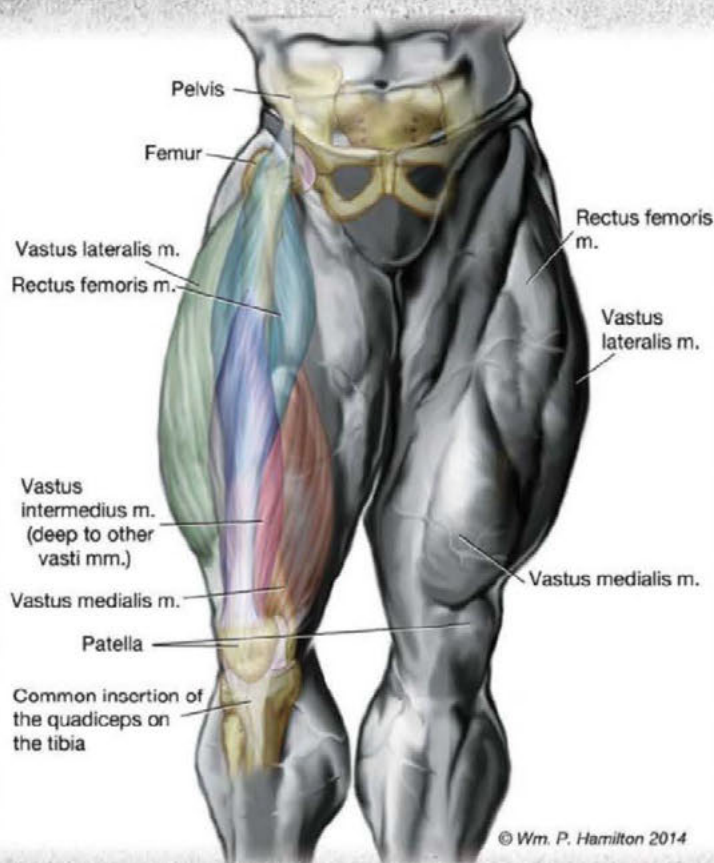
MUSCLES ACTIVATED BY ZERCHER SQUATS

Zercher squats hit the four quadriceps femoris (quad) muscles of the anterior (front) thigh.¹ The fibers of the rectus femoris muscle run from the hip along the front of the thigh to join the quadriceps tendon above the kneecap (patella). The rectus femoris extends the leg at the knee joint.² The vastus medialis muscle makes up the medial (inner) part of the thigh. This creates the "teardrop" area that is on the inside of the knee just above the patella (kneecap). The vastus intermedius muscle lies between the vastus lateralis and the vastus medialis muscle, but it is deep to the rectus femoris muscle.² The vastus lateralis muscle makes up the lateral (outer) part of the thigh.

The three vastus muscles are anchored to the femur bone of the thigh and attach to the quadriceps tendon, which is attached to the patella. The patella is then attached to the tibia bone of the lower leg by the patellar ligament. As the muscles of the quadriceps shorten, they pull on the tibia, which extends the leg (i.e., straightens the knee).² The three vastus muscles are not affected by hip angle,² so they are active throughout Zercher squats.

ZERCHER SQUATS

Holding the weight will quickly get uncomfortable across your upper forearm and biceps tendon. If you feel a sharp pain, drop the weight (if you have bumpers) or finish your set early and shake out your arms to get the blood



ZERCHER SQUATS

1. Spend five minutes stretching and warming up your knees before starting Zercher squats.
2. Position a barbell on a rack. If you have bumper plates, they would be best in case you need to drop the barbell, as the bumpers would prevent damaging the plates or the floor.
3. Extend your forearms out in front of your body. Flex your elbows so that your arms look like you just finished a curl, and place the bar on top of your upper forearms at the base of your biceps tendon.
4. Step away from the rack. Position your feet so that they are a bit wider than shoulder width, and point your toes slightly outward.
5. Flex your knees and as you begin to squat, keep your back vertical to the floor and your head up. This is the same body position as a front squat.
6. Continue dropping toward the floor until the angle between your upper legs and calves becomes a bit less than 90 degrees. At this point, the back of your elbows will likely just contact the top of your thighs.
7. After reaching the bottom, stand up but do not explode out of the position with an extremely bent knee, since this can cause a serious injury. Starting upward slowly will help protect your knees when they are in a vulnerable position. Accelerate the weight upward only after you are partway up.³
8. Don't lock out your knees at the top position, because the stress will be removed from your quadriceps and the bones of the hips and thigh will transmit the force downward without the need for muscle activation.
9. The next repetition is the same as the first, so that the body is lowered slowly into the squat position, but it is raised upward strongly.
10. Place the weight stack back on the supports at the end of your set.

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Zercher Squat (start and finish)



Zercher Squat (low position)



flowing again. Be careful not to drop too rapidly to the bottom part of the squat, as this could hurt your knees.⁴ The idea is to maximally work your thigh muscles, but to have mercy on your knee joints.

Zercher squats are great if you want to change up your routine or if you have had back injury⁵, and you cannot do heavy barbell squats due to the compressive forces that regular squats would have on the spine. Zercher squats will tend to isolate the anterior thighs better than barbell back squats.⁶ If you find it really tough on the biceps tendons, you might try to find a thick rotating bar to lessen that burden. However, do not be afraid of stopping early if your arms are in too much discomfort. You can be guaranteed of deep screaming that will echo from your anterior thighs, and this exercise will keep you wobbling between sets— but the compensatory mass-building adaptation that will occur from a few sets of Zercher squats will be worth it. ■

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THE DESIGNER ANABOLIC STEROID CONTROL ACT OF 2014:

IS CONGRESS REALLY SERIOUS?

IS CONGRESS SERIOUS ABOUT SCHEDULING ALL PROHORMONES AS CONTROLLED SUBSTANCES UNDER THE FEDERAL ANTI-STEROID ACT?

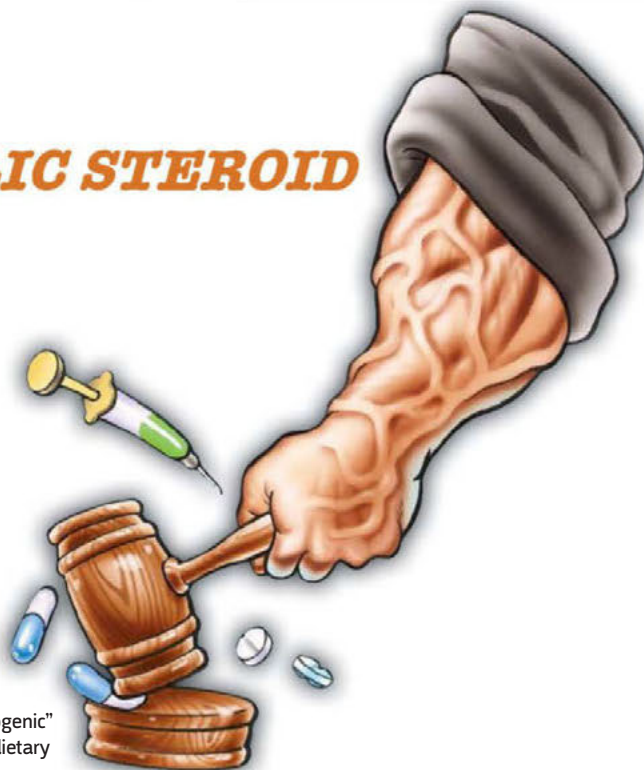
A: It's hard to tell what our dysfunctional Congress is serious about these days. But a new version of a bill that was floated around Capitol Hill a few years ago has now been passed by the House of Representatives. Dubbed the Designer Anabolic Steroid Control Act of 2014—DASCA—it would take yet another stab at getting steroidal dietary supplement products—so-called “prohormones”—off the market and preventing new ones from being introduced by classifying them as anabolic steroids under the Controlled Substances Act. The latest draft version of the bill, H.R. 4771, crossed my desk for comment before being passed. We now await action in the Senate.

This draft of DASCA would immediately place 25 known designer anabolic steroids on the list of controlled substances and it would make it easier to list new designer steroids. The focus is on design and marketing. DASCA says that “a drug or hormonal substance (other than estrogens, progestins, corticosteroids and dehydroepiandrosterone) that is not listed ... and is derived from, or has a chemical structure substantially similar to, 1 or more [listed] anabolic steroids [is considered an anabolic steroid] if ... [it] has been created or manufactured with the intent of [promoting muscle growth or having pharmacological effects like testosterone or] has been, or is intended to be, marketed or otherwise promoted [to suggest it will promote muscle growth or have pharmacological effects like testosterone]” [emphasis added]. Note that under the Senate version of the bill currently awaiting action, S. 3431, there is no requirement that the steroidal substance actually promote muscle growth or act like testosterone pharmacologically—only that it's created, manufactured, marketed or promoted with the intent of doing so. That's a lame basis

for declaring something a controlled substance. The House bill fixes this problem by exempting any steroidal substance that is “not anabolic or androgenic” (also exempting herbs, botanicals and dietary ingredients).

The DASCA introduces a whole new theory by which to prosecute steroid trafficking cases by making it a crime if a product containing an anabolic steroid doesn't bear a label clearly identifying the anabolic steroid by accepted (IUPAC) nomenclature. This provision would apply to manufacturers who use deceptive or “creative” ingredient labeling to conceal that the product is an anabolic steroid. It would also apply to distributors and retailers who know, intend, or have reasonable cause to believe that the product contains an anabolic steroid. Criminal penalties can be up to 10 years imprisonment and fines up to \$2.5 million on corporations. Civil penalties can be up to \$500,000 per product violation and retailers can be hit with a \$25,000 penalty per product violation.

The DASCA will criminalize anyone in possession of designer steroids. The 2004 amendment to the federal steroid law was written to take effect 90 days after enactment. This “grace period” protected consumers, who were buying steroidal supplement products every day, unaware that the ingredients were illegal. The situation remains that way today, with self-proclaimed “legal” prohormones widely available online. If you're a consumer, the “legal” bottle you bought on Tuesday could be classified as a controlled substance on Wednesday—putting you in criminal possession of an illegal drug. Unless Congress amends the DASCA to include a grace period, innocent consumers would be turned into



federal drug criminals overnight. At a time when our nation is rethinking the success and sanity of the War on Drugs, expanding it to target fitness consumers—especially overnight—seems seriously misguided. I've communicated this concern to Capitol Hill.

Does the DASCA have the potential to banish steroidal ingredients from the retail supplement market? Yes, but the bigger picture is unclear. Will consumer demand for muscle-building steroidal substances simply disappear? Or will the reclassification of these items and their removal from the dietary supplement market lead to the creation of a black market for them ... or to an increased demand for the traditional pharmaceutical anabolic steroids already on the black market? The steroid black market ballooned after the enactment of the 1990 steroid law. The realities of demand and supply and our experience with alcohol Prohibition would suggest that legislative efforts like this one don't entirely eliminate problems but instead may push them underground. If the DASCA becomes law, time will tell. Meanwhile, you can follow me at [Facebook.com/RickCollinsOnline](https://www.facebook.com/RickCollinsOnline) to keep track of the DASCA and be informed about other legal developments important to bodybuilders and fitness peeps. ■

“Unless Congress amends the DASCA to include a grace period, innocent consumers would be turned into federal drug criminals overnight.”



Rick Collins, Esq.



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THE BODYBUILDING WIZARD

A HUGE ROUND OF APPLAUSE FOR TODAY'S PROS

So many older guys like to talk about how the sport was so much better in the '90s. They claim the pros today don't get into the same condition, that the national shows and the pro shows were deeper in terms of quality, etc. You were around in the '90s, and you also go to the contests now where we have phenomenal athletes like Phil Heath, Kai Greene, Shawn Rhoden, Dennis Wolf, Dexter Jackson, Big Ramy and so on. Is this a case of people just being nostalgic for the old days and not giving the current guys their due credit, or was the overall quality really better 20 years ago?

I think the quality of competition today is just as good, to be honest. And to give the current guys credit, we see a lot more bigger men getting into great condition now than we did years ago. There were exceptions, but 20 years ago the shorter, lighter guys were the ones who usually got in the best shape while the biggest men didn't. Another thing these guys now should get credit for is their longevity. Rarely did you see pros in the '80s or '90s who were active competitors in the IFBB for even 10 years. Now you have guys like Dexter who is 16 years into his pro career. Cutler retired (not officially) after 17 years as a pro. Give today's bodybuilders their credit, because they do work hard and they look fantastic.



BEGINNER'S ROUTINE: FOCUS ON BASIC, COMPOUND MOVEMENTS

Hi Charles. I know you work with some of the best bodybuilders in the world today, like Dexter Jackson and Shawn Rhoden. I am hoping you have some good advice for me, a regular guy who just decided I want to be a bodybuilder at the age of 30! I played sports in high school but never did much weight training. I am in good health and have no injuries.

Would you please help me put together a good beginner routine I can use for maybe six months to a year to build a nice foundation, before I start getting fancy and try to train more like the stars of the sport do? I know I am a little old to be starting out, but I know if anyone can help me start off the right way, it's you! Thanks in advance.

The first thing you should know is, it's never too late! And 30 is still a young man these days. You should have many good years left to grow and

build the physique you want to. What I would suggest is a routine that focuses mostly on basic, compound movements. Those are what's going to put the most mass on you, and give you the most return on your investment, so to say. You don't need to split the body up into days for each body part, either.

Here is something simple you can do. I didn't list warm-ups, but you always want to warm up for each exercise. Just as one example, say your first "work" set on the bench press will be 135 for 12 reps. Your warm-ups could be the 45-pound bar for 20 reps, 95 pounds for 12, and 115 for 10. You never want to jump into a working weight without properly preparing both your mind and body for it! Not only will your performance suffer, but you will be inviting injury. ■

Got a question for Charles? Email it to him at editor@musculardevelopment.com and you could see it answered right here in MD!

DAY 1: BACK AND BICEPS

Deadlifts	4 x 12, 10, 10, 8
Chin-ups	4 x 10-12
Barbell Rows or T-Bar Rows	4 x 12, 10, 10, 8
Barbell Shrugs	4 x 10-12
Barbell Curls	4 x 10-12

DAY 2: CHEST, SHOULDERS AND TRICEPS

Bench Press (increase weight each set)	3 x 12, 10, 8 reps
Incline Dumbbell Press	3 x 12, 10, 8
Military Press	3 x 12, 10, 8
Upright Rows	3 x 10-12
Dips	3 x 10-12
Skull-Crushers	3 x 10-12

DAY 3: LEGS

Squats	5 x 15, 12, 10, 10, 10
Leg Press	4 x 15, 12, 10, 10
Lying Leg Curls	5 x 10-12
Stiff-Leg Deadlifts	5 x 10-12
Standing Calf Raise	4 x 20, 15, 12, 10

DAY 4: OFF



BEST BODYBUILDER OF 2014

Guru, in your opinion, who is the best bodybuilder of 2014? I mean, who is better than the rest?

What do you mean, who is the best bodybuilder of 2014? Of course it's still Mr. Olympia Phil Heath, the last time I checked! But if your question is who has made the best gains that we all saw and felt in 2014, then I can give you my picks.

Let's begin with the new version of Dennis Wolf when he won the Arnold. I know that guy has finally arrived and can't be denied any longer. I also thought that Branch Warren looked awesome— if not, arguably, his best ever this year. Dexter Jackson kept on surprising once again at nearly 45, beating all of the youngsters, and also looking his best ever.

Kai Greene, without a doubt, made amazing gains— and I thought we had enough to win the big game but once again I was wrong, I guess. What I saw at the 2014 Mr. Olympia contest was different from what the judges saw, and you have to respect that because this is their job— and they know better, and they can analyze things that you and I can't.

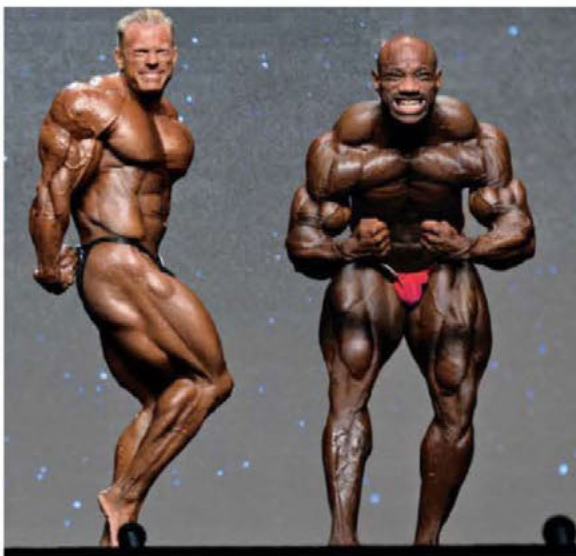
What caught my eyes the most was the new look of Justin Compton. Watch out for that kid— he skipped the Olympia in 2014, but I know we are going to see something very special in 2015.

Lots ups and downs in 2014 but remember, this is only my opinion, and what I saw with my eyes.

George Farah is presenting his opinions and he does not, in any way, shape or form, encourage or condone the use of any illegal or controlled substances.

Nothing contained herein is to be construed as medical advice. Use of any drugs and exercise regimen should only be done under the directions and auspices of a licensed physician. The writer does not claim to be a medical doctor nor does he purport to issue medical advice.

Follow George Farah on Facebook at [facebook.com/georgefarahdietguru](https://www.facebook.com/georgefarahdietguru) or on Twitter @gvfarah. For more information, visit www.georgefarah.net.



KAI'S PROBLEMS IN PRAGUE

Mr. Farah, can you please give us the scoop on Kai Greene and why he didn't finish the Prague show? My understanding is that the fans were upset, etc. Can you be kind and explain what really went down?

Let's see ... Kai finished the Olympia and had to head from Vegas to New York, and then fly to Spain the next day for an appearance— not to mention, meet and greet his enormous fan base and shake hands and kiss babies, only to turn around and take another flight to Prague. Mind you, with all of this, Kai was still on a very restricted diet and without going into details, he caught something. Kai reacted like it was food poisoning, and it was treated that way. Honestly, I thought at first that he was good enough to carry on with the prep, but I was wrong. As soon as Kai finished posing, he felt totally dehydrated and did not feel like himself. When I tried to replenish him with food, he couldn't hold it down. So we decided not to continue, because I am all about health and staying healthy.

As for the people out there making up stories— stop, please. The next time you vomit a few times, we'll see how you're willing to go out on the stage to battle it out with the best in the world! I think I made the right call. To those who are still talking about the fans being disappointed, Kai was not on the list to compete to begin with, so please stop!!

Until next time, stay focused and most importantly, healthy.

VITAMINS AND MINERALS ARE IMPORTANT FOR MUSCLE GROWTH

Pro maker, how important are vitamins to bodybuilding while taking gear? Do I really need them?

Wait a minute— people are really still asking this silly question? Multivitamins and minerals are crucial for anyone who wants to pursue bodybuilding the right way. You can waste tons of money on gear, but you will skip \$15 or \$20 on vitamins? Big, big mistake. Some vitamins and minerals are so important for growth and recovery that you would be nuts not to use them if you are looking to be not just a bodybuilder, but also a healthy and good bodybuilder. Vitamins and minerals are important pieces of the puzzle for growth, and you should get the best products your money can buy. ■



prepared and didn't have food with him backstage, because he did. The problem was that it was never clear exactly when he would need to get onstage, so he was only eating very small amounts of food sporadically. Fortunately, Phil was still good enough so that I was fully confident he would retain his title. It wasn't as easy or as dominant as we had both wanted it to be, so by the time he stepped offstage, all I was focused on was how to get his physique back to where it should have been for the finals the following night.

Before I get into how we did that, I would like to respond to the many inquiries I had about Phil and Kai's exchanges at the press conference and the brief confrontation they had onstage Friday night.

"Phil chose to take the high road. That speaks to his character and shows that he has class."

Phil was speaking about how he wanted to dedicate his performance this year to his father, who had passed away. This wasn't easy for Phil to talk about, as he had a tumultuous relationship with his father growing up and they weren't close for most of his life. Kai chose to interrupt Phil more than once, with statements such as "the past is the past," and others I won't repeat here. Phil could very easily have mentioned several facts about Kai that would have certainly made him uncomfortable and put him on the spot to respond to them in front of the entire industry, but he chose to take the high road and kept it

to himself. That speaks to his character and shows that he has class. In my opinion, it's fine to talk smack about each other's physiques, but there are lines that should not be crossed. Bringing someone's family in the discussion is just bad taste.

I didn't attend the press conference, as I had arrived in Las Vegas with a chest cold that nearly turned into pneumonia early in the week, and had to avoid smoky casinos until I felt better. I was proud and grateful that my clients spoke for me at a couple of points. Steve Kuclo was asked if he was in shape, and he said, "My coach is Hany Rambod, so yeah, I'm in shape." George Farah told Phil Heath that Phil was going to retire after this show, so confident was he that Kai would win. Phil calmly grabbed the microphone and asked, "George, how many Sandows have you won? Because my trainer, Hany Rambod, has coached every winner since 2009."

As for the incident on stage where Kai whipped Phil with his braid and then got up in his face, I disagree that it added excitement to the proceedings. This is a physique competition, not the WWE.

What did Phil do from Friday night to Saturday night that filled him back out? First and foremost, he finally got a good night's sleep. The next morning he said, "I feel like a new person." We bumped up his meal frequency that whole day so that he was able to get more meals in, and I also made sure to keep him rested and ready for the finals by limiting his time at the Gifted Nutrition booth to a couple of hours at the expo. That night, Phil was about 95 percent of his best and closed the door on any chance Kai had to beat him. Congratulations to Phil for working hard, never complaining and doing what it took to get his fourth Mr. Olympia title, even when things didn't go exactly as planned.

I also want to congratulate my client Nicole Wilkins on winning her fourth Figure Olympia title. She was right on point, looked amazing, and won with a perfect score. Last but certainly not least, congratulations to my client and Evogen athlete Jeremy Buendia for winning his first Men's Physique Olympia title. He did an excellent job of adding six to seven pounds of quality muscle since last season, all while maintaining his lines and his 28-inch waist. I couldn't be more proud of my team. This made 13 Olympia titles for me so far, and it's always rewarding to help athletes achieve new personal bests.

NEXT MONTH:

I want to talk about Steve Kuclo, who I give the "Most Improved Award" for winning the Arnold Brazil and placing ninth at his second Mr. Olympia contest.

Instagram: hanyrambod, Facebook: Hany Rambod

THE WAR FOR FOUR

The show is long over now, but people are still talking about it. Phil Heath fended off Kai Greene and won his fourth Mr. Olympia title, but at the judging on Friday night he was admittedly at 85-90 percent of his best. Phil's condition was not the issue. He was flat, and his physique lacked that 3-D "pop" he is known for. So being his coach, everybody wanted to know from me, what happened?

There were a few things that on their own would have made only a negligible difference. But combined, they took a toll on Phil's appearance. First and foremost was lack of proper rest. As you know, Phil launched his Gifted Nutrition supplement company while in the midst of his prep. The already heavy load of appearances and interviews he normally is obligated to do as Mr. Olympia for the week in Las Vegas leading up to the show was substantially increased. Another factor was the weather in Las Vegas, which was hotter than usual and didn't help matters. And the final snafu was the timing for Friday night's judging. When someone is as lean as Phil was, a meal or two can make a big difference in staying full or flattening out. We had timed all his meals to get onstage at 9:00 p.m., but with other parts of the show continuing much longer than anticipated, Phil did end up missing meals. It's not that he wasn't



3 THINGS TO MONITOR DURING PREP

FOOD

This is where it all starts and ends. As a bodybuilder, I was well aware of this from the start. Each macronutrient (the body needs a large amount of macronutrients to function, hence the word macro) plays a specific role in your muscle tissue development and maintaining your size during contest prep. There are three major macronutrients that the body needs to function properly:

- **Protein** is used by the body not only to build muscle, but also to repair tissues. Protein is the building block of muscle (only protein can build muscle), both off-season and during prep. Protein helps prevent the breakdown of muscle during prep, and can still build it. When incorporated into a high-intensity workout, protein builds extra lean muscle tissue while you are dieting for a show. I recommend two grams of protein per pound of bodyweight while dieting.

- **Carbs** are used to provide

energy to your muscles. Carbohydrates are stored in your muscles and liver. When you work out, your body converts these stored carbohydrates into ATP and uses it as energy. Carbs increase insulin level in a positive manner, in which they ascend other growth-promoting hormones and enzymes needed to keep your muscles full of glycogen while dieting.

Lowering your carbs is sometimes necessary to burn off extra body fat, but when you drop your carbs too low, it increases your insulin levels in a negative fashion. The body then uses any source of energy it takes in and stores it in the fat cells. You can put your body in a catabolic state if your carbs are too low. My recommendation for carbs while dieting is 1.5 to two grams per pound of bodyweight.

- **Healthy dietary fats** play a big role in the production of hormones that are responsible for growth and strength increases,

like testosterone production. These hormones are vital while dieting. They help keep your body in an anabolic state. Examples of healthy fats are MCT oils, flaxseed oils, omega 3-6-9 oils, fish oils and CLA, among a few others. Healthy fats help spare protein from being used as an energy source. They also help reduce water retention by assisting in sodium and water removal. I recommend 0.3 to 0.4 grams of healthy fats per pound of bodyweight.

EXCESSIVE CARDIO

Cardio does burn calories and body fat, but it cannot be excessive to the point that it breaks down muscle. Too much cardio leads to the release of elevated levels of cortisol (stress hormone), which makes you retain water. The correct function of cardiovascular exercise is to burn calories/burn body fat, strengthen your heart and lungs, improve bone density, lower blood pressure, keep cholesterol in check and

improve overall stamina— not to break down muscle!

During cardiovascular exercise, your body turns to glycogen that it obtains from carbohydrates for energy (the reason you need to eat carbs). If there isn't enough glycogen (carbs) available, your body may turn to fat stores or muscle (again, if there's not enough carbs) for fuel. Cardio is used to condition the body. If you're eating enough food to "cushion" your muscle from breaking down, then your heart rate should be around 130 to 140 heart beats per minute.

The last thing to keep in mind is that if you don't get fat in the off-season, then you don't have to kill yourself doing cardio during prep.

SODIUM MANIPULATION AND "DEHYDRATING" THE BODY

I don't believe in sodium manipulation. If you are already including sodium in your diet and it's keeping you full, and you're getting harder each day, just keep it in the same. You don't want to mess with your aldosterone levels by playing with your sodium intake. Aldosterone is a hormone that increases the reabsorption of sodium ions and water, and the release (secretion) of potassium ions in the distal convoluted tubules of the kidneys. Sodium manipulation is very risky. If done right, it releases more sub-q (subcutaneous) water but if done incorrectly, you can look watery and a mess on stage.

Your muscle tissue is 70 percent water. When you "dehydrate" or restrict your body from water, you are in danger of losing muscle fullness and actually looking more watery (even though your body fat is low, your skin hangs if your muscles aren't hydrated). You want to hold and be hydrated with intracellular water to make the muscles look fuller and harder.

Lastly, water is a natural diuretic. You want to increase your water intake to 1.5 to two gallons per day while contest prepping. The more water you drink, the more water your body will let out ... it's that simple. You also have to hydrate your body before you begin to pull water or you will flatten out at the end of the prep.

To contact me, please email me at fakpro@aol.com. I'm on Instagram at [instagram.com/fakhrimubarak_ceo_ifbbpro](https://www.instagram.com/fakhrimubarak_ceo_ifbbpro), on Facebook at [http://www.facebook.com/FakhriMubarak](https://www.facebook.com/FakhriMubarak) and on Twitter. Have a great month, everyone and as always: "Champions do what competitors don't!"

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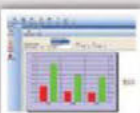
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LABORATORY TESTED FOR PURITY AND POTENCY

What Is Pharmapro About?

The Pharmapro Mission is to bring you The Most Powerful Legal Anabolics You Can Buy Anywhere. All formulas are backed by sound scientific research. Every Pharmapro product is manufactured with the finest ingredients and quality assurance is maintained throughout the manufacturing process. Very few companies test their products using the same rigorous protocols as Pharmapro.

Every bottle of Pharmapro products are tested for:

- **Assay** - using HPLC and other advanced methods to assure products meet or exceed label claim.
- **Microorganisms** - to screen for bacteria including salmonella and e.coli as well as yeast and molds.
- **Heavy Metals** - to screen for lead, mercury, cadmium, arsenic and other toxic metals.

What We Are NOT About

No Legal Versions of Illegal Steroids (These just don't exist), No Bogus Chemical Names, No Hiding Our Supplement Facts, No Gimmicky Holograms, No Hype, No BS,.....JUST RESULTS

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MAXSTERONE®

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Maxsterone® will enhance your protein synthesis such that its anabolic effects translate to extraordinary Gains in Mass, Strength and Density. You will be amazed at how quickly the product works as some have reported strength increases in just the first few days. By the end of week 2, your Muscles Appear Larger and Fuller and strength is up even more. By the 3rd and 4th week of the cycle, you're lifting more weight than you've ever imagined and Muscle Size and Vascularity are at levels you've never seen before. Side effects such as acne, hair loss, prostate issues are not a worry with Maxsterone. Nothing is More Anabolic!



FUROSTAN™

1 BOTTLE \$79.95 OR BUY 2 GET 1 FREE \$159.90

Furostan is responsible for creating Ripped, Sculpted physiques, like those of today's top pros. It is an excellent cutting agent and is a great choice to use during dieting while maintaining strength and size. Competitive bodybuilders will use it prior to competitions for that dry, shredded look. Athletes focused on getting lean but less interested in bulk will be very pleased with the results on this product. Strength gains are excellent and most will notice an increase in stamina almost immediately. A favorite for those that wish to increase strength and endurance while staying within certain weight parameters. THE PATH TO RIPPED, SHREDDED MASS!



MAXITEST™

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Since 2003, Pharmapro has established itself as the leader in gray market formulations you won't find in stores. We specialize in combining unique ingredients at efficacious doses for maximum gains. Our newly formulated MAXITEST™ combines 5 of the most advanced Test boosters available. In recent studies, the ingredients in MAXITEST™ have been found to have a profound effect on testosterone levels. Individuals involved in intense resistance weight training may benefit the most from MAXITEST™ as elevated testosterone levels accelerate muscle protein synthesis which leads to MASSIVE GAINS.



LIPOPRO®

1 BOTTLE \$49.95 OR BUY 2 GET 1 FREE \$99.90

LipoPro™ has a 5 way effect that helps you shed adipose (fat) tissue fast. The formula also has a distinct thermogenic effect that you will experience within 45 minutes of use. You will feel a bit warmer than usual with higher energy levels. LIPOPRO also supports your thyroid gland to allow for maximum thermogenesis and also keeps blood sugar levels stable to prevent food cravings between meals. Retaining water is no longer a problem with LIPOPRO as it contains 2 natural diuretics that help you body from accumulating excess water.



SERMADEX®

1 BOTTLE \$64.95 OR BUY 2 GET 1 FREE \$129.90

SERMadex is our next generation Anti-estrogen/Test booster. SERM is an acronym and stands for Selective Estrogen Receptor Modulator. SERMadex uses 3 cutting edge compounds to control estrogen by reducing the estrogen hormone's ability to bind with its corresponding receptor. SERMadex also boosts Test levels which make it ideal to take at the end of any cycle. The gains you will derive from SERMadex are dry gains so you can expect excellent vascularity while bloating is not a factor. You can use SERMadex as a primary supplement for estrogen maintenance and as a powerful test booster. Definitely should be a primary component to your Post cycle regimen.

B

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A black and white photograph of a muscular man with a serious expression, looking directly at the camera. He has a beard and is wearing no shirt. His right shoulder and upper arm are covered in intricate tattoos, including a large dragon or mythical creature design. His hands are clasped in front of him.

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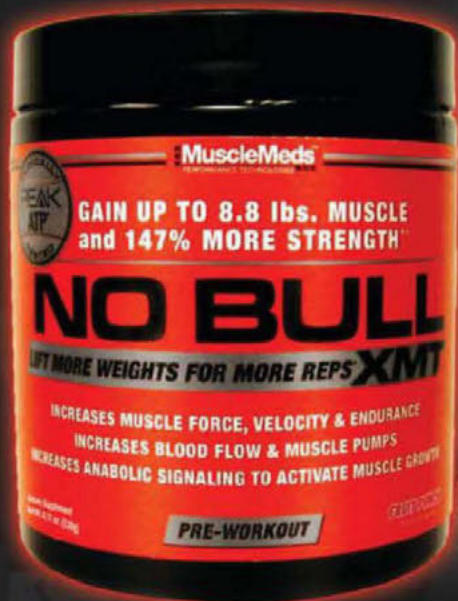
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LIFT MORE WEIGHT FOR MORE REPS **XMT**

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In the development of NO BULL XMT, MuscleMeds researchers focused on a key mechanism in muscle called "Excitation-Contraction." Enhancing this mechanism of action in muscle tissue helps increase muscle force, velocity and endurance, thereby increasing time under tension and total workout performance. In addition to enhancing muscle excitation-contraction, NO BULL XMT's advanced synergistic design also increases energy, muscle pumps and anabolic signaling, making it the ultimate performance enhancing pre-workout formula. NO BULL XMT is the pre-workout formula for those who want more... More weight for more reps equals more muscle growth!



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*Claims based on a clinical dose taken before training, based on double-blind placebo controlled study using 400 mg of PEAK ATP, following a specific diet and exercise program. Visit MuscleMedsRx.com for study. Your results may not be typical.